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ABSTRACT

This volume represents a fairly complete record of a conference held in January 1977, of more than 100 individuals from Hawaiian businesses, governments, educational institutions, and other groups, which was organized by the University of Hawaii's Research Center for Futures Study. Transcripts and papers from participants, on the following topics, comprise the bulk of the document: changing communication technologies--options, problems, and possibilities for the future; information flow--into, across, and out from Hawaii; skills needs and development--multicultural, multimedia, and anticipatory; public interest--privacy, rights, equity, access, and citizen participation. Opening and closing remarks are included. The appendixes include a participant list, a participant profile, and an agenda. (LL)

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HAWAII'S COMMUNICATION FUTURES: POLICY AND PLANNING ISSUES

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A CONFERENCE REPORT OF THE

HAWAII RESEARCH CENTER FOR FUTURES STUDY

JANUARY 1977

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PREFACE

A day-long meeting of more than 100 individuals from Hawaii's businesses, governments, educational institutions and other groups was held in the Hawaiian Electric Company's auditorium on the 17th of January 1977. Topics covered included: Changing Communication Technologies, Information Flow, Skills Needs and Development, and Public Interest Issues.

Panelists and speakers from the various segments of Hawaii's society were joined by a distinguished guest, Herbert Dordick of the Annenberg School of Communications, Los Angeles, in a wide-ranging discussion of many crucial communication issues.

Organized by the University of Hawaii's Hawaii Research Center for Futures Study, the meeting was the first of several such activities planned for 1977.

This volume represents a fairly complete record of the conference. Due partly to time and budget constraints, the transcripts and papers have not been given the kind of editorial attention which is customary. However, this is an informal publication, designed to be of immediate use as a digest of conference proceedings, and we trust that the participants in the conference will be tolerant.

Appreciation and thanks are due to Mr. Jesse Lopez for his many hours of transcription, to Ms. Jeanette Avent for her editorial work, to Ms. Gayle Ing for her skillful typing, and to Professor L.S. Harms for his guidance and hard work. We are, of course, indebted to all who played an active role in the conference.

Richard J. Barber
Acting Director
Hawaii Research Center for Futures Study

A C K N O W L E D G M E N T S

Commission on the Year 2000

Communication Committee,
Advisory Council on the International
Relations of the University of Hawaii

Communication Task Force,
Oahu Council of Presidents

Department of Communication,
University of Hawaii at Manoa

Department of Educational Communication and Technology
University of Hawaii at Manoa

Hawaii Telecommunications Association

East-West Communication Institute

Graduate School of Library Studies,
University of Hawaii at Manoa

Technological Information Center,
Department of Planning and Economic Development

* * *

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for the use of their auditorium

* * *

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* * *

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"ALTERNATIVE FUTURES"

Gerald Sumida

As an historical rule, we generally become aware of profound transformations in our society only after those transformations have been taking place for some time. By the time that we are able to appreciate fully what these changes are and how they are affecting our lives, we have already tended to accept them as somewhat commonplace and perhaps even as inevitable. We may not particularly like these changes or the prospects they offer, or we may see new opportunities that could be quite useful and desirable. But it is only by looking back from a viewing point in time that we can detect a pattern of events, the emergence of certain forces, and the crystallization of social processes that shed some light on the nature of the transformations taking place.

The communications revolution--or more accurately, the revolutions in the technologies of communications--lies at the base of the most pervasive and profound societal transformation in modern history. Indeed, we can aptly refer to our post-industrial society as the "communications society" and to our present as the "communications era." Certainly the explosive proliferation of recent advances in communications technologies as well as the countless ways, obvious and subtle, in which these innovations are altering our attitudes and patterns of thought and action justify these designations.

We have already linked virtually every populated area of the earth into a global communications system, which has begun to coalesce the human race into a single global society. We are even attempting to communicate with extraterrestrial civilizations by means of continuous deep space transmissions as well as the pictorial greeting attached to the Pioneer-10 space vehicle launched in 1972.

The emergence of the communications society results from the most recent of four major revolutionary developments in communications: the evolution of spoken language, the emergence of written language, the invention of printing, and the electronics revolution. More specifically, within the compressed time span of less than 200 years, we have seen a plethora of inventions in communications technologies, including the newspaper, the telegraph, transoceanic cables, radio, the telephone, and the moving picture. Within the hyper-compressed time span of some 30 years, we have seen an accelerating outpouring of such inventions as television, computers and other information processing machines, communications satellites, CB radio, lasers, cable television, computer conferencing systems, fiber optics, holography (permitting the projection of three-dimensional images), and more.

Aside from expanded possibilities for education, entertainment and commercial advertising, the most important impact of these advances in communications technologies has been the enhancement of the information process. John McHale describes this in the following terms:

> "Human information processing is unique...in the degree to which man has consciously elaborated and transmitted his personal information interactions through sophisticated symbol systems...human society is essentially dependent on its common symbolic systems....They provide both its cohesion and its 'reality'.
>
> What is new and critical in human affairs is the recent externalisation of these software information processes into hardware tool systems, which perform various types of information processing for man--at greater speeds, with greater precision and the capacity to deal with greater quantities of information than the unaided human senses."

The innovations in communications technologies provide tremendous opportunities for rationalizing and systematizing the information process in order to assist decision-making in many different areas of human activity, whether for private businesses and organizations, international bodies, governmental agencies, legislatures, or for society's general political processes. A few illustrations suggest the possibilities that are already available:

First are computer conferencing systems which enable widely dispersed parties to engage in continous decisional interactions. They also permit a person to leave the conference at any time and obtain a full update of intervening discussions upon returning. Particular variants are EMISARI, developed for use by the U.S. Office of Emergency Preparedness, and the "Hotline International" system in which groups located around the world can participate in international conferences. This latter possibility was explored for persons at the University of Hawaii and the East-West Center in connection with the United Nations conference on human settlements recently held in Vancouver.

Second is the ACCESS project, an action/research policy-oriented project concerned with using telecommunications to increase the capabilities of public decision-makers and interested citizens to defend and enhance the quality of life in their region as they determine it. This project, which is funded in part by the National Science Foundation, is sited in the South Coast Region of Santa Barbara County, California.

Third are various modeling-simulation projects aimed at defining alternative policy choices for particular geographic

areas or regions and determining through simulations their consequences. These include the Hawaii Environmental Simulation Laboratory, the Hawaii construction industry simulation of the Hawaii Research Center for Futures Study, the Regional Simulation Study of the University of British Columbia's Resource Science Center, the Geographic Planning and Analysis System developed by the Battelle Memorial Institute for Des Moines, Iowa, and New York City, and other regional information processing and planning systems.

Fourth are electronic public referenda on critical public issues. The Televote system, developed on a pilot basis in several communities, governmental agencies and schools in California by Vincent Campbell, enables the particular constituency to explore critical issues and then through a telecommunications system decide upon a course of action. The TV Town Meeting, sponsored by the Regional Planning Association based in New York City, provided citizens in New York, New Jersey and Connecticut with the opportunity to participate via television in town meetings dealing with regional issues of housing, transportation, environment, poverty and cities/suburbs, and to "vote" by ballot on specific policy issues. These pilot programs suggest that citizens in large communities, and even whole societies, may be able, at minimum cost and inconvenience, to participate in public decision-making through telecommunications systems.

These and similar innovations in communications technologies, particularly those involving information processing and analysis for decision-making purposes, can greatly assist us in Hawaii to explore systematically the policy choices, both public and private, confronting our State and especially the consequences of such choices. It would be useful, for example, if we could explore through simulations the consequences of major legislative and executive action before such action is taken. This could result in refinements and improvements in proposed policies or in refraining from taking such actions, if the consequences would be other than as desired.

Moreover, the communications revolution, which has virtually eliminated geographical distance, opens up exciting possibilities for Hawaii to become the communications center of the Pacific. Indeed, telecommunications systems such as those of the U.S. Pacific Area Command, the Communications Satellite Corporation, and the University of Hawaii's ALOHA system have already made Hawaii an important link in a regional communications network.

The expansion of these systems, especially those involved in business, education, health and the communications industry itself, should be carefully and systematically studied. We should also seriously explore the possibility of establishing what Robert Theobald has called the "Terran Communications Center." This center would have both information-processing

and transmitting capabilities, but would be primarily engaged in regional and global problem-solving. It would have computerized information banks with information gathered from all parts of the world and would use this information to simulate the conditions under which problems arise. From such simulations would come both proposed solutions and alternative courses of action, as well as the capability of anticipating future problems.

Most fundamentally, however, we must also seriously explore the need for a very basic and vital communications process in Hawaii to help us determine and depict what future for Hawaii we prefer and how we can attain that preferred future. The communications revolution makes possible the processing of prodigious amounts of information, while generating at the same time the need for even more information. Obviously, we must be able to categorize and analyze this expanding mass of information in order to obtain and create as much useful and meaningful knowledge as possible about particular problems and possibilities.

But vast quantities of information and even various forms of knowledge do not, and will not, in themselves provide us with the meaning and values that we deem essential for all of us to continue to nurture the kind of society that we prefer to live in; one that embodies a system of values and human relationships that we subsume under the phrase "the Aloha Spirit." Nor will information and knowledge in themselves furnish the wisdom required of us all to choose and maintain a course that will preserve and enhance the values and qualities of life that make Hawaii and its people virtually unique among the world's societies.

We can today see within our society social, economic and even cultural forces that threaten to erode, if not more quickly destroy, the warmth, friendliness, and the ethos of caring and cooperation embodied in the Aloha Spirit. Many of these forces will, in any event, perhaps continue to change our diverse ways of life. However, the distances of space, culture and awareness that are subtly separating the various communities and diverse ethnic and socio-economic groups are not being bridged by effective processes of communication, interaction, concern and problem-solving. We cannot, particularly in this instance, abdicate our concerns to our political leaders, legislators and government agencies. What is at stake is our cultural identity, which is itself composed of many cultural diversities, and the overarching value system which binds our society together.

We must reestablish, or establish anew, processes of communication within Hawaii's society to bridge these emerging gaps between and among our diverse communities. This is our ultimate and greatest communications challenge. It lies at the heart of our defining and working toward a common, preferred future for Hawaii. We will not be able to meet this particular

challenge in communications by relying upon sophisticated, technologically advanced communications hardware. Nor will we be able to rely on complex, highly efficient information processing and knowledge-creating systems. All of these may, in some fashion or another, be of assistance. But the greatest effort must center upon the most basic communication process between people, and must deal on the most elemental levels of human interaction and common concern and effort.

For many decades Hawaii's people have been communicating a fundamental message to the rest of the world. It has been a very simple yet a very complex message. This message is "Aloha"--a human symbol, an emotion, an image in the mind's eye, an aspiration, an ideal. Many have appreciated and heeded this message; many have not; but most have been influenced by it. We must now strive to ensure that the energy bearing that message is not dissipated by the passage of time and events, and that this message is still there to be transmitted.

"CONFERENCE ORIENTATION"

L.S. Harms

At the beginning of the decade when the Hawaii 2000 work was first under way, a number of far-reaching changes were becoming evident in the communication field. The spectacular Apollo 11 walk-talk on the moon provided a preview of the shape of things to come.

Since 1970, many of us in the communication field have been concerned with the large scale changes being brought about by: new communication technologies; global interdependence, and, cultural pluralism. Any one of these three--technology, interdependence or pluralism--introduces enough complexity, enough new problems to make our work interesting for the rest of the century. We have to somehow deal with issues of a type and in a scale that is new to most of us--beyond our previous experience.

Today, our intent is to begin a program of information sharing, study, and discussion about Hawaii's Communication Futures. Later in the day, after we have spent a few hours examining a number of policy and planning issues, Richard Barber will sketch out some of the work underway now in Hawaii and suggest what some of our next steps might be.

Two long term efforts--one in Canada, the other in Australia--can serve us as models, if we adapt them to the special conditions in Hawaii. The general goal is to help build a knowledge base appropriate for the important policy and planning decisions that will be made in the years ahead. Such a knowledge base will need to include data, information, a knowledgeable professional community, and an informed public.

In September 1969, at about the time the Hawaii 2000 work was getting underway, the Canadian Minister of Communications

> "announced plans for a comprehensive study. . .of the present state and future prospects of communications in Canada. The purpose was to gather as much information as possible, together with the widest cross-section of opinion, and the Minister accordingly said that participation by all concerned from any source would be given careful consideration."

These are the opening words of a remarkable book drafted by Henry Hindley and titled Instant World. This book summarizes the first two years of work by the Telecommission, as the Canadian effort was called. More than 40 separate studies were completed. Six major conferences were held. Public hearings and discussions were held at various levels in many parts of the country. Hindley

noted that "the facts about Telecommunications are far from plain and can be variously interpreted by those looking at them from different viewpoints."

Instant World concludes:

> "Some important themes recurred throughout the course of the studies. Most important, perhaps was the insistence that communications are of the people, by the people and for the people. If it be accepted that there is a 'right to communicate,' all Canadians are entitled to it. New systems, new services that are coming into use today, and others that can be forseen during the next decade or two, can be harnessed, given the will and the purpose, to provide new opportunities, new alternatives, and new and more satisfying ways of life and habits of mind. . . . Thus, a desirable objective of Canadian communication policy might be to ensure access to telecommunications services. . . . on an equitable basis."

This last policy point on "equity" provided the central thesis for a new document published two years later in 1973 under the title, "Proposals for a Communications Policy for Canada, A Position Paper of the Government of Canada." This policy paper was followed by another in 1975. The effort to build a coherent body of communication policy continues.

Some of that policy effort has been translated into plans that have in turn led to more equitable services. The ANIK satellites, for instance, are configured to serve both the populus South and also the sparsely populated North on an increasingly "equitable" basis. These new satellite based services are considered to be a direct outgrowth of the Telecommunication studies.

In Australia, an effort of similar scope was undertaken by the National Telecommunications Planning Branch of the Planning Directorate of the Australian Telecommunications Commission beginning early in 1974 under the title of Telecom 2000.

> The task was conceived, and has been pursued, as an examination of the capabilities and the role of telecommunication in the society of the future.

The first two years of the Australian effort was summarized in a report titled Telecom 2000. It resembles the Canadian effort in number of studies, consultations, discussions, seminars and conferences. It differs from the Canadian effort in that the emphasis is on planning rather than on policy.

The Canadian Telecommission worked from a policy approach and went on to consider planning. The Australian National

Telecommunications Planning Group did the opposite. They began with a planning approach and went on to outline the implications for policy.

What is striking in reviewing the studies as well as the two summary documents, Instant World and Telecom 2000, is that the knowledge base for these two efforts is remarkably similar and one must add, very large and growing rapidly. And of course, the two approaches, policy and planning, are related, and at some levels and in some contexts are not readily distinguishable.

In reviewing these two efforts, we felt that this first meeting on Hawaii's Communication Futures might reasonably begin to identify some of the key issues for both future communication policy and future communication planning efforts.

As you know, both communication policy science and communication planning science are multi-method and problem-oriented approaches. Both are new sciences, still taking shape, growing, developing. Still they are advanced enough and well enough tested to provide some useful tools.

Both the Canadian and Australian efforts grouped the set of specific communication issues into a small number of general issue areas. We have attempted to do the same. The four general issue areas grow out of wide-ranging discussions in various groups in Hawaii.

As shown in the program for this conference, the four general issue areas or "baskets" selected are: Technology Applications, Information Flow, Skill Acquisition, and Public Interest.

The discussion today will be organized around these four groupings. If at the end of the day, we think it worth our while to continue these discussions, Dick Barber will outline one possible timetable for doing so.

"CHANGING COMMUNICATION TECHNOLOGIES--
OPTIONS, PROBLEMS, POSSIBILITIES FOR THE FUTURE"

Ned Weldon, Panel Chairman

The theme of our discussion this morning is the impact of changing technology on future communications.

The tendency here or the temptation for the panelists is to predict. We know about technology, we think we have a feel for what society needs in the way of communications. So it's tempting to predict what will happen in about 10, 20 or 50 years. I'd like to caution the panelists (they're very cautious to begin with) that this is a difficult game. The business of predicting where technology will take society is extremely error-prone. What I'd like to do is first of all try to give you some idea why that is and to give you some examples--kind of humorous examples--of what things have been predicted recently.

First of all, what we're doing is very analogous to predicting the motion of a random point, so-called Brownian Motion. What we have is some imperfect knowledge of the position and velocity of a point and direction and we're trying to predict where that point will take us down the road at some unit of time. There are two ways in which you can ere. One is direction. We have no idea when this point will change direction; this is analogous to technical breakthrough--new technologies that we sit here and are totally ignorant of. The other problem, one not so severe, is just misinformation about the current position and velocity. In other words trying to predict from current trends just how far and how fast communication technology will do is difficult.

With that in mind let me tell you about some predictions that were made 15 years ago, 1962. The 50th anniversary of the I.E.E.E. (the Institute of Electrical and Electronic Engineers) published an issue of their proceedings which was about 3 inches thick and was chalkfull of predictions by the experts as to where technology will take us in the next 50 years. This is the year 2012. Now I'll spare the predictors further embarrassment by leaving their names out. I'll just give you their positions in the various firms they were associated with and tell you what they predicted. I've gone through these and I've called out the most interesting ones--some of them were totally crazy, others totally unimaginative. These are somewhere in the middle.

First. Let me give you some general comments. This was 1962--post-Sputnik. Practically everyone of these predictors, these eminent scientists, missed the electronics revolution, the thing you can buy today for 3 or 4 dollars was not forecast by anyone. That's number one. All the implications that that

has had on the future of communication electronics was missed. Most of the predictions, more than half, were realized within five to ten years of the prediction, and this was a 50 year forecast! These are the super-conservatists speaking. Many other predictions were just crazy or wrong. They were wrong at the time predicted; they couldn't happen. And then, of course, there were lots of humorous seeming stabs at predicting these breakthroughs. Everyone knows these are going to be breakthroughs. We try to project when and where they will occur. This is very risky business. So let me give you a couple of examples. Again, if you're interested in the names, come and see me afterwards.

The President of CBS laboratories topic, of which he was presumably very knowledgeable, was communications electronics. He predicted that satellite communications would not be viable and that all trans-oceanic communication would turn out to be via cable. Secondly, audio amplifiers by the year 2012 would have shrunk to the size of four by three by two inches. Perhaps you're not familiar with this but audio amplifiers of one fourth by one fourth by one-thousants of an inch have been realized. Thirdly, microwaves would carry all long-haul communications by the year 2012. (Today microwaves carry essentially all long-haul communication; by the year 2012 I think we'll hear today that it will probably not be true anymore.) The fourth prediction that he made was that miniature T.V. cameras would be realized by the year 2012. Cameras perhaps like something you can hold in your hand. (The speaker noted the two video cameras being used to videotape the panel discussion, ed.)

The second example, the president of the I.E.E.E., as head of the sponsoring organization would presumably think more carefully about his words. He predicted that by the year 2000 we would have space vehicles orbiting the inner planets. He also predicted we would land instruments on Mars and Venus. Fairly conservative gentleman there since both of course have been realized.

The third example is by the Director of Engineering at Sangamo Corporation. His topic was radio electronics. He predicted that radio receivers would never become smaller than a "one pound box of candy" and the reason for this was that you couldn't repair them if they got that smaller than that. I don't know if you've been to Long's lately but they're that small already. He predicted that we would start to use, by the year 2012, system simulation, that is, rather than building systems we would simulate them on a computer and try them out that way rather than going ahead and building hardware. Of course, as you know, this is done commonly today. In fact, I was doing system simulations in the early '60's myself so I don't know where he was.

These are the conservative ones, the ones that aren't crazy. Let me tell you about some of the ones I call "wild stabs." These are attempts to predict future changes in technology.

There were quite a few predictions of automatic language translation by the year 2012. Now, that's still a possibility. It turns out that since the year 1962 the amount of scientific effort devoted to that problem has dropped by a factor of five. People are starting to understand the problem and are saying that it's just too hard for us as we understand language today. Very likely, no one will predict that this problem will be solved by the year 2012 today.

There were many predictions of biological processing. The computing and information storage using biological media. To my knowledge and the knowledge is good, there's very little work in this area today. Not that it's not important but it seems to be too hard for our present state of understanding. Of the many predictions made, the most common for the year 2012 was that much communication would be done via E.S.P. In fact one of these predictors flat-out predicted that by the year 2012 E.S.P. would replace radio. So, I'd like to close with those warnings to our panelists. This is all being recorded and may well come back to haunt you in the years to come.

"CHANGING COMMUNICATION TECHNOLOGIES--
OPTIONS, PROBLEMS, POSSIBILITIES FOR THE FUTURE"

Karen Ah Mai, Panelist

I've always liked to be on panels with telephone company people because they do half of my job for me and I only have to do the other half.

On the ground, on the earth there're two types of media for transmission of communication and these are mainly wire and micro-wave. Bud (Schoen) has covered new developments in essentially wire or wire-light transmission. Both wire and microwave type transmission are generally operated on a point-to-point type of configuration. And they generally link two users together--two people or two groups who are situated at the two points at the end of the wire or the end of the microwaves. Those are the people who participate in the communication.

Satellites provide another means of communication. The International satellites are 24,000 miles up in the sky and they're relatively distance insensitive in terms of costs of transmitting the communication. They cover a sphere of about 8,000 miles. They can see about one third of the earth in their beam. There are also domestic satellites which are not as high as 24,000 miles up and their span is appropriately smaller. At the present time most commercial operations use the satellites as a cable in the sky; another type of point-to-point link. But the true new potential for communication satellites lies not only in the point-to-point capabilities but in the broadcast capabilities of these satellites.

Let's take a simile. A telephone lets you connect two stations or two people together. There's a tremendous cost in providing the wires, the switches, the exchanges in order to provide this basic two-way communication. Now let's take a television station. A television station broadcasts a message. There's one transmitter and there's a multitude of relatively low cost receivers. Now, $399 for a t.v. set might not seem to be thought as low-cost, but when you think of the investment that's fixed in a telephone network to allow communication you can see that the cost of one television transmitter and many receiving stations is relatively cheap. You have at least one-way communication from a central source out to many people, and it's rather inexpensive in terms of the supporting technical equipment. A satellite can be used to transmit much more massive volumes of information than a telephone line. In that way it still can be used for point-to-point communications but it can also be used to broadcast.

Let me, at this point, make a distinction in two types of satellites. One has low power in the sky, such as we might have

in the Intel Sat IV's that bring in T.V. signals and some telephone transmissions from the mainland and other places. When you have low power in the sky you need huge antenna on the ground. If you go out to Pamaluu and look toward the mountains you see huge dishes out there. These dishes or antenna are what is required to bring that signal down from the satellite and transmit it along terrestrial links so that we can receive it in our television stations or in our phone company. The ground antenna costs in excess of about 300,000 dollars. The alternative type of satellite arrangement is when you have a high power in the sky satellite and low costs ground stations. NASA has been experimenting with this type of satellite for many years. You might of heard of ATS-1 which went up a long time ago and was supposed to have died several years ago but now the scientists tell us that its getting stronger and stronger. We have some experimental things taking place on ATS-1. We have the PEACESAT network which links by radio communication the West Coast, Hawaii, and many South Pacific Islands together. All of these stations can talk to each other simultaneously. The ground stations cost about 5,000 dollars apiece as opposed to three hundred thousand for the big dish. Commercial satellites are of the first type--low power in the sky big dish on the ground with a land based communications system to distribute the signal once you get it back down to the ground.

NASA is now initiating a new series of satellites. More so, they are trying to aggregate consumer demands. These new satellites are for public service and I think this has great implications for many of us who might not be commercial users. These satellites are being designed to be very powerful in the sky and to have extremely low-cost ground stations. All of the ground stations would be able to receive the signal. Most of them would be able to transmit signals back to the satellite so what they say can be heard elsewhere. The services that are suppose to be provided include video, which is your t.v. size signal, voice, facsimile and data transmission.

The implications are these. The present system requires the use of ground based transmission which has to go through a very complicated network to get from one place to the other. It's complicated even just here in Hawaii. But if we had to teleconference or conduct extensive communications with, let's say, Washington, D.C., we have some problems. First of all we have to get a connection. We have to keep in mind that they're sometimes 4 hours ahead of us and sometimes 5 hours ahead of us. Well, we have these little problems. But when we talk about broadcast-type satellites the technology is such that you don't have to go through the massive amount of technology on the ground to get the signal transmitted from one place to another. You simply send it up to a bird in the sky, it sends it down to all points that are receiving. It's not a point-to-point type thing. It's like a television station in the sky sending out it's signals to all who want to receive it. You can shut off your communication simply by turning off the set or turning the

frequency to some other station, so to speak. I think the most important thing are the applications that will be possible with this type of technology. You may have all heard of electronic mail. The post office is attempting in the next decade, or the next two decades, to try and replace the letter that you write with electronic mail. They'd like you to type it in or go to the post office and have it typed in or somehow made into a digital signal. Right now the big hang-up is that the postal service cannot use public service satellites. But there may be a change in the law. You can see the implications. Mail from Hawaii can be transmitted to the mainland in the same day. It doesn't have to suffer the loss of time having to travel across the ocean in an airplane or a ship. We can save a lot of time. For those of us who are grant or proposal writers for grants, heaven knows that we get the notice three days ahead of the time that the material is due in Washington 72 hours hence. Unless we hire a courrier we couldn't get it to Washington through our mail service. But with electronic mail it goes up and comes down just as fast from Hawaii to Washington as well as Washington to Washington. So you see a lot of implications here for increasing the ability of remote places like Hawaii to communicate with the rest of the world.

Another big thing that's coming up is electronic funds transfer. It doesn't really exist in any great volume today. Banks are very concerned about this in the future. We do have credit cards and checks being checked through telephone lines. But this is a small part of what can happen in the future. You know, we get a visitor coming down here with his Bank Americard and he's going to buy $500 worth of clothes. We are not going to make a long-distance phone call to find out if his credit is good. Yet with electronic funds transfer and credit checking methods via satellite this can be instantaneous or almost instantaneous.

Another thing that's especially good for people who are interested in person-to-person communications. Teleconferencing capabilities can be made very simple with this high powered public service type of satellite.

NASA last October got together a group of about 100 people who talked about public service satellite applications, including teleconferencing. If we were able to get teleconferencing with many small stations communicating with each other--can you imagine a CB radio in the sky except that it gives you television capabilities? This is what they want for the future and I don't think really it's that far off. I don't want to predict. But you know the technology is in place. However, it's the legal and economic constraints that are holding a lot of this development back. Another form of teleconferencing is telediagnosing. If somebody in Pearl City has a malady and a person in Connecticut had the same thing, via satellite they could very easily transfer information to help each other. This is used a lot in the Alaskan bush where doctors are scarce.

in continuing education, a great use of this type of thing, is for retraining doctors, lawyers and Indian chiefs. Members of such groups do not exist all in one community. They exist across the United States. If true, this type of satellite broadcasting could reach all of the doctors at the same time and all of them could communicate back to some central point at the same time. This would be a great boom for instance in the recertification of professionals which is coming up in our society. Of course there are many other programs such as law enforcement. If, for instance, Hawaii 5-0 wanted to know what a person did in Washington, D.C., they could get it more instantly than they do now. With health programs there are many problems in disseminating health information. This type of satellite can be used to do that. We have a number of problems in inter-governmental communications. Many agencies seem to be doing much the same thing but they don't seem to really speak the same language or they don't speak to each other. Also the common citizen has a difficult time communicating with its several levels of government.

"CHANGING COMMUNICATION TECHNOLOGIES--
OPTIONS, PROBLEMS, POSSIBILITIES FOR THE FUTURE"

Bud Schoen, Panelist

There are two significant trends in telecommunication technology that I would like to talk about. The first is the trend towards all digital transmission - the second is the use of optical transmission. Together these two are bringing about a revolution in telecommunication that has just barely started. What do they mean?

DIGITAL TRANSMISSION - This is the language of computers, the language of machines, just what does all digital transmission mean?...won't humans talk to each other any more?

A quick review of terms: Voice [illegible] is now stated like an analogue signal. An analogue signal is just what the [illegible] sounds like. [illegible] are converted into an electrical analogue of the original sound wave by the [illegible] on the [illegible] end, the electrical analogue wave is converted back to sound waves by the [illegible] at the receiving end.

On the other hand, signals from machines, computers, terminals, etc. are digital in form, and are represented by a signal that is either on or off. Another term for this is binary...two states...on or off...zero or one...plus or minus. To send a digital signal over an analogue circuit requires some equipment to convert the on-off digital signal to a varying one. Turning a steady tone on or off is one method. Shifting its frequency back and forth between two values is another. The equipment that does this is commonly known as a "modem" or a data set. Simple ones that merely shift frequency back and forth can send data at about 120 characters every second...more complex and expensive ones can reach rates of 960 characters per second over a normal analogue voice circuit.

Back before World War II, a man named Reeves invented a system for converting analogue signals to digital forms. His equipment would sample the analogue signal at a very rapid rate, measure each sample, assign a numeric value to the sample, interleave a number of these samples together and transmit them as a digital signal. Sound complex? You bet. Needless to say it was so complex that it was too costly to use.

The invention of the transistor and later the integrated circuit changed all of that however...nowadays all of that sampling, measuring and encoding can be done by one inexpensive I.C. chip. This brought the price of digital multiplex (more than one circuit) down below the cost of equivalent analogue multiplex systems.

Today 24 voice circuits are encoded into a composit digital signal and are sent over wirelines equipped with repeaters that regenerate the signal about every mile. What is really significant is that to handle speech, the digital transmission rate for each channel is equal to 6400 characters per second...a very respectable rate of transmission for data. The 24 channels require a 1.544 million bit per second or 154 thousand character per second transmission rate. About half of our interoffice communication channels are now digital.

In 1979 we will put into service a new switching system for long distance and local tandem service. It will be computer controlled, but we have computer controlled switches now. The big difference is that one will handle digital signals

Now optical transmission. For a number of years man has known that light represented an economic high capacity method of communication. The problem was to find a good transmission medium since the air was pothered with fog, clouds, buildings, etc. Over the last few years a lot of work has been done on using glass fibers to conduct the light. There have been real breakthroughs recently and a number of trials are underway.

A glass fiber, about the thickness of a thin human hair, can transmit light without any intermediate repeaters for about 5 miles. Although the cost is high now, potentially glass fibers can be quite cheap...sand is one of our abundant minerals. Transmission speeds can reach 44 million bits/sec or the equivalent of 672 voice circuits without requiring costly electronic circuits or expensive fibers. The size is another benefit, many more circuits can be placed in existing ducts so that we will not be having to dig up the streets as much...an extremely costly business these days.

Ok what does all of this mean in down to earth terms?
The trend towards digital transmission means that both voice

and data can s
to machine com
of glass fiber
capacity and s
scarce).

are the same facilities. Man to machine and machine
munication will be simpler and less costly. The use
cables complements this nicely, providing the large
ubstituting glass (abundant) for copper (getting

The use of glass fibers to reach the home will provide that
large capacity that will allow services such as picturephone,
being able to get what you want to see on TV, data retrival,
library servic es in the home, and many more of the services of the
future.

"CHANGING COMMUNICATION TECHNOLOGIES--

OPTIONS, PROBLEMS, POSSIBILITIES FOR THE FUTURE"

John White, Panelist

I'm not going to predict anything. What I'm going to talk about is what I feel is a problem with the rapidly changing technology and that essentially it effects everything except E.S.P.

Both Ned and Bud mentioned the cost factor in communication and electronic technology and said that things were getting a lot cheaper. There is, however, a situation now which may cause our costs to go up and thereby reduce availability. The net affect of a very rapidly developing technology may be to actually reduce the availability of a new technology to consumers. This is due to three reasons. The first reason is a reluctance on the part of the venders to commit themselves to a certain technology level and actually market the items. Before they can get something to the market, another technology has come out to take its place.

Secondly, there's a reluctance of potential consumers to invest in new products, fearing they'll be obsolete before any use can be gotten from them. This reluctance was noted recently in several journals. Many people who were potential customers for the IBM 360, 370 and especially the 370, were holding back on their investments because it had been rumored for a considerable period of time that IBM was going to drop their FS--Future System--on the market. People hesitated to invest a million or 2 million into something that might be obsolete or not have a high market value at the end of a short period of time.

Thirdly, there are increased costs to the consumers because the venders have to recover the research and development costs. When they have to redesign something 3 or 4 times to make it competitive on the market before they actually get a marketable good out, they have to recover these development costs. I know of one situation, where I was personally involved, that concerned the Financial Data Sciences in Florida. They were trying to produce a terminal for financial applications. Before they could get their terminal on the market they had to completely redesign the terminal 4 times, although the functional capabilities of the original unit and the functional capabilities of the end unit remained identical. Everytime they would get partially through with the design and development work, somebody would come up with a new microprocessor, minicomputer, or a new display device. As a result research, development, and lead time went up considerably.

So, these are some of the problems I fear are associated with an extremely fast developing technology. As of yet, I don't know a solution to these problems.

"CHANGING COMMUNICATION TECHNOLOGIES--

OPTIONS, PROBLEMS, POSSIBILITIES FOR THE FUTURE"

Herbert Dordick, Panelist

I'm not going to talk much about new technology, but what I'd like to talk about is a very subtle way of predicting things. One of the problems of making predictions is someone can always say "yes but..." The "but" that I'd like to contribute is--yes the cost of communications is likely to stay the same or in fact go up, assuming that present regulatory trends continue.

We have a lot of evidence piling up that present regulatory trends are not likely to continue. There is also evidence of more and more competition in the common carrier field which will enable people to perhaps get different kinds of communication services at different prices. As of right now, there is a major conglomerate firm, based in Los Angeles, that has provided all of its member companies with a private telephone line which enables people to dial up and generally not get a busy signal. The firm succeeds in doing this at a cost substantially lower than they would normally have to pay AT&T. They do this by buying a little bit of AT&T here, a little bit of Southern Pacific Communications there, a little bit of ITT over there, and then they pick up General Telephone somewheres else. They are making use of a notion--which has recently become a major issue--that there can be competition in the common carrier field with the specialized common carrier. Many of you have probably heard about the consumer Communications Reform Act which AT&T tried to put into Congress the last session, and I'm sure you will be hearing more in the future. All of these developments show that we are beginning to look at Communications now as a resource with options for choice, which is something new. In the past, you never had much choice. There was one way to get television--you turned on the television set, you hoped to get good reception and you picked up one of several networks and a few independent stations. They pretty much gave you the same thing, and you couldn't do much about it. Now, if you happen to be on a cable system you can buy a pay movie, you can look at data and if you live in some communities, you can talk back to your T.V. set.

All of these are choices that are now becoming available to us. I think that the whole notion of the right to communicate that Stan Harms has been pioneering becomes much more real when you consider that with this right comes the right to choose between resources. The option to choose resources and to mix them becomes the basis for research planning. Once you have alternatives you have to find a way of making choices. And what we in Futures Research do a lot of is to model the way we make choices. There are lots of ways of modeling; indeed, the whole

notion of futures research with the Delphi technique is just one way of modeling how one might make choices about the future.

What I'm going to report very briefly on is some research in progress. It has often been suggested that we use available economic models, the kind that are used in regional economics and input-output modeling, to find out what impact on a region investments in communications will have. I agree with all the criticisms of this kind of approach because it takes into consideration only what has happened in the past. It assumes that the future is going to be very much like the past, and, therefore, doesn't take into consideration great surprises nor possible changes in policy. What the economic model approach does consider, especially if we use some of the input-output tables that economists have used for years, is that certain industries operate in certain ways; they buy so much resources from other industries and they use these resources to generate their own products. These products are sold sometimes as finished goods which people buy and use. Otherwise, they are sold to other industries as resources to be utilized by their operating facilities to generate new products. I agree that there's a lot of difficulty in using this kind of an approach, especially for communication. We know that communication has a tremendous impact on society. We know that it affects the way people think, it educates people, it has a great deal to do with the way we view politics. It's rather surprising to me that it's only been in the last 15 years that we've really become interested in the impact communication has on our lives, because it is the one technology that has surrounded us or engulfed us more than any other technology we know of. Yet, it's only been recently that we've become aware of the effects of television violence, children's programs and advertising. We know that communication has a substantial impact on society; the kind of economical model that we're trying to use here perhaps does not take that into consideration.

Even with all of these drawbacks, I find that an economic model does help a great deal to get some indication, even if it's not a complete picture, of the whole. It does help to give you some idea of what the impact on a region is going to be if you make certain investments in communication. For example, there has been over the last several years a lot of work done with multi-regional, multi-economic forecasting models which essentially translate the input-output tables that economists use. In the past this work was done to predict, for example, what happens if we were to drill for oil off the coast of Maine. If we drill for oil, we have to build refineries on the coast of Maine. The next step is to build highways to get trucks to the coast where the refineries are. And since there's only so much money invested in highway construction in the United States, that means that some of the money that would have been used to build highways in Texas is now going to be used to build highways in Maine. This is what the economists call the impact on the endogenous investment that is made.

This model can also be focused on a given region. We can ask what happens to this region if we widen the highways, put a warehouse in, and do other things that one can subsume under the general heading of transportation. What happens to the output of economic resources in that region? Is there an increase in output? And what happens to the population in the region? The model is then able to show you what happens over a period of twenty years from, say, 1970-1990 to the output of various industries and the kinds of jobs that are possibly being developed in these industries as a result of the investment in transportation.

We took this kind of model and argued that we could design a communication index or some measure of communication resources, and put it into the model. By simulating investments in communication, we would be able to see what impact these kinds of investments have on a region.

When we actually did the research, we used a couple of small rather rural areas in the U.S.: Pit County, North Carolina and Indiana County, Pennsylvania. (The model is, however, capable of being used for the Hawaii region.)

We designed two kinds of indices. One was to reasonably measure communication information utilization by individuals in a region. It was based on personal radio, T.V., newspaper, cable, and telephone. The second index, which we called an industrial-communication index, was designed to reflect the use of communication resources by business and industry. The problem of doing this kind of work is that your index is only as good as the data you have available to you, and in this country there is precious little data about communication available in terms of the sort of things we want. There is very little time-series data that would tell you how many T.V. sets have been purchased by what kinds of people in the years 1950-1970. It is also very difficult to find out how many telephones have been purchased in a given time period, and when people switched from multi-party lines to private lines.

We were able to obtain one of these runs for industrial communication in these two regions, and found some things that were quite interesting. It was shown that certain industries would benefit more than others by investments in communication. State and local governments, for example, would grow as a result of increased investment in communication. The entertainment markets would develop further. Banking, brokerage firms, finance and insurance companies would increase their employment and thereby increase the amount of money they produce for the region. Other industries that would grow as a result of investments in communication include: the wholesale trade, the inventorying of produce, and the medical and educational industries.

Now, what these results really point to is that our society is becoming more and more of an information oriented society. Earlier, a speaker talked about a communication society; I prefer

to think of it as an information society. More and more of our people are employed in industries that produce nothing but information. Government is an information industry. The medical profession for all practical purposes is an information industry. Educational facilities, schools, universities are all information industries. The wholesale industry and the people who run large multi-firm warehouse facilities for the distribution of food are largely concerned with information about what is in the warehouse and how quickly the turnover occurs. So, what our economic model tends to show among other things is that investments in communication will help develop these information-based industries.

The model also indicates to us that in the long term the impact of an investment in communication is greater than a similar investment in Transportation. In the early stages of the transportation investment, there's much higher employment and much greater output from the region, because it costs a great deal of money to build a highway. It doesn't cost that much money to put up a microwave link. In time, once the highway is built the jobs disappear and there seems to be a much slower growth of other industries making use of that increased transportation, at least in the regions we looked at. (It varies with region, but I think if we ran the model for the state of Hawaii, the results would generally be the same.) On the other hand, the communication investments start out very slowly in making jobs or increasing regional output, but continue to grow. At the end of the designated 20 year period, we found in one region a net increase of about 11% in the gross regional product resulting from the investment in communication. That means that over the 20 year period, for this small investment in communication, there was an 11% increase in the output, in the amount of dollars generated, and an 8% increase in jobs.

Perhaps we've found a way in which to really explore the transportation-communication trade-off properly. We all know it costs a lot less energy to make a telephone call than to get into your car and drive that distance, but still, it's not being done. I think it's important to find out what will happen to a region if one were to make the choice of putting dollars into communication versus dollars into transportation.

How would this industrial analysis benefit Hawaii? Well first you say Hawaii would like clean industry. Clean industry is generally equivalent to, in many respects, information-based industry. The very industries I mentioned before are so-called clean industries. If indeed it is true that an x dollar investment in communication might result in the growth of banking and finance maybe that's the sort of decision the state of Hawaii should make to attract additional industry, and to broaden its economic base.

At the risk of predicting, I'd like to make two quick points. I think that in the next 20 years we're going to have

a "wired" nation; by "wired" I mean we're going to have an era where there's going to be a great deal of communication capability available. Many people, myself included, have begun to use the term wire or cable as a synonym for multi-channel, broadband capabilities delivered by satellite, direct broadcast, fiber optics or by cable. Whatever the terminology, the important thing is that every home will have the ability to make choices from a lot of different communication inputs coming into the home. I also predict that we're going to have policy debates ad-nauseam about how this is going to happen. When you have these kinds of national policy debates it brings with it increasing opporunities for state and local input; I think this is going to be a tremendous change in the way the U.S. has handled its communications.

Many years ago Justice Brandis made the comment that the state is the proper place for experimentation, for development, and for finding out how to do things. I think communications policy development will provide the opportunity states have been waiting for to play an important role, a significant role, in determining how they should handle their own economic development in which communication will play a significant part.

"INFORMATION FLOW--INTO, ACROSS,

OUT FROM HAWAII"

Jim Richstad, Chairman

The second panel deals with the subject of information flows--into Hawaii, within and across Hawaii, and from Hawaii to the outside world, with a view to policy and planning issues of the future.

Information is sometimes viewed as a nice, neutral, non-controversial commodity. It seems to have been so used in the earlier panel's discussion. But we all rely on certain kinds of information to do our daily business, in our work and in our social and cultural lives. Information is not neutral people use it for a range of activities, and how it is gathered and distributed and who controls it are critical public policy issues.

At the East-West Center, we are concerned with the flow of international news and information, and the concerns of smaller, less economically developed countries that don't get the kinds of information they need for development, and are poorly represented in the global flow of information. The imbalances in such flows have become a global issue in international communication policy, with charges of "information imperialism" and "cultural imperialism." We live in an information or communication age, as earlier speakers noted, but we also live in an age where information imperialism is an international issue. While a comparison between Hawaii and other countries cannot be carried too far, we do see concerns in Hawaii about how the state is represented, and we are concerned with getting the kinds of information we need at a cost that we can afford. We know from the study of international communication that the "free flow" of information favors those in control of the communication systems and possessing the requisite skills.

It costs money to bring information into Hawaii, to move it across Hawaii, and to send it from Hawaii. And Hawaii faces an unusual situation as far as communication flow goes--we are more than 2,000 miles from any other significant communication center. The state is composed of islands with consequent communication difficulties, and we have a multicultural community, which, as Gerald Sumida put so well this morning, has special information needs and sensitivities. Being a "small marketplace" for information poses problems as well.

The flow of information is looked at in at least two general ways. First, we can look at the volume of the flow, the messages, the technology--how much of what kind of information flows to and from whom. Second, and much more difficult to assess, are the effects of certain kinds of flow on people and communities. This is the human and social element in information flow, and the most important.

"INFORMATION FLOW--INTO, ACROSS,

OUT FROM HAWAII"

Jan W. Huston, Panelist

INTRODUCTION

As Daniel Bell correctly once stated, whereas energy production drove industrial society, information production drives the post-industrial (or as I have come to call it, the ideomergent) society, whose class structure is based on access to information and control of decision-making processes. Thus it is based upon control of information and specialized knowledge rather than on ownership or control of property.

After the First Industrial Revolution was made possible by James Watt's steam engine, the second one was created by conveyor belt of mass production by Henry Ford. He then created the sales concept of the "Model T", which was to make large earnings from large selling of less expensive commodities. What is needed now, by analogy, is mass distribution of information services:--a way of providing the services and making them available adequately to meet aggregate demand. In this case, information services, instead of physical commodities, must be distributed and brought to bear on a specific situation, where and when the need arises. Thus a wide-spread and economic computer-communication network is clearly essential to the mass distribution of information services, just as a wide-spread and economic distribution network has proved to be essential to the mass production of goods. To this end information is synthesized and advanced by people. One should realize that it is not an easy process for people to find one another or to get to know one another with the current pace and complexity of our society.

Existing communication structures are either very slow (printed journals), very fitful and expensive (yearly conferences or special meetings), or very exclusive (personal letter, personal visit or telephone calls). The computer can be used to enable humans to more fully realize their potentials and actively and efficiently participate in the decisions which affect their lives. The technology is now available and sufficiently cost effective to revolutionalize peer group communications; this, in turn, will alter the nature of formal publication process.

Computer conferencing will enable members of the user group to keep in constant communication with one another and to exchange ideas and findings on a hourly-daily-weekly basis, or continously send and receive such materials at their own convenience, thus increasing the visibility of material and ideas as well as aiding in the locating of materials in other areas.

In its simplest form, Computerized Conferencing is the utilization of a computer system to structure the communication process among a group of people in order to facilitate the exchange of information and ideas. Such computer mediated communication systems allows a group of people who wish to communicate about a topic to go to computer terminals at their respective locations and engage in a discussion by typing and reading as opposed to speaking and listening.

In addition, the computer takes over much of the bookkeeping of the exchange and offers a greater variety of communication capabilities than available by other methods of communication. The computer keeps track of the discussion comments and the statistics of each contributor's involvement in the discussion.

In the use of telephones and face-to-face meetings, the flow of communication is controlled by the group as a whole. In principle, only one person may speak at any time. With the computer in the communication loop, each participant is free to choose when he wants to talk (via typing) or listen (via reading) and how fast or slowly he wants to engage in the process. Therefore, the process would be classified by psychologists as a self-activating form of communication.

Computer Conferencing is unique as a communication system inasmuch as the content of a message can serve as an address. One can go to a computer system and choose to enter a discussion by merely picking a topic. Groups can be formed through the system over any common concern. Further, since all the individuals are operating asynchronously, more information can be exchanged within the group in a given length of time, as opposed to the verbal process where everyone must listen at the rate one person speaks. Furthermore, because the computer stores the discussion, the participants do not have to be involved concurrently. Therefore, an individual can choose a time of convenience to oneself or to go to the terminal, review the new material, and make ones comments.

The computer-mediated communication system is not meant to totally replace all other communication forms. However, if wisely used, it should cut down markedly on the amount of travel and personal meetings which are necessary and thus help to make those necessary face-to-face meetings which are held more productive by establishing a common information base ahead of time. Introduction of these devices will thereby represent a major shift on information perspective along with a rethinking of roles, missions and objectives on a multitude of levels.

THE ELECTRONIC INFORMATION EXCHANGE SYSTEM (EIES)

Using a half hour, self-taught communication structure or program called Electronic Information Exchange System developed by Murray Turoff at the New Jersey Institute of Technology allows

any group of persons to discuss, evaluate, and assess complex topics such as those that might concern a group of researchers in the same field of endeavor or a group concerned with the management and objectives of such Policy Planning and Decision Making efforts.

As an aspect of verbal imagery, EIES as an acronym refers to the ability of the system to extend the information sending, receiving, and processing capabilities of the individual across time and space in a manner never before possible.

In essence the EIES program provides the four necessary components of an information exchange environment:

1. A message - containing private space between individuals
2. A conference - with common space for a group
3. A notebook - allowing personal space for an individual
4. A bulletin - providing public space for anyone interested

With the EIES Program, the computer appears to the user as one very large blackboard and the terminal an extremely long piece of chalk. There are approximately 30,000 pages of text material that can be put into this blackboard every 300 users or members of the system. For the members or users to utilize all of this space, the blackboard is structured or divided into various parts that perform different functions for them.

1. There is a directory of members where a user can find out, in various ways, with whom he or she can communicate. There are also groups of members defined in the directory which indicates a set of individuals having a common interest and/or objective. This provides a message capability which allows a user to send correspondence to any other members or to a particular group.

2. Another part of the blackboard, is set aside for personal notebooks so a member may at ones leisure compose and edit text for later use or for transfer to other parts of the system. The user may also invite others to jointly author or read in his or her notebook. The notebook is a private writing space over which the member has total control.

3. There is the conference capability which stores the proceedings of a discussion among a set of members. Normally each group would have its own private conference. Furthermore, there are certain public conferences anyone can review and add comments to, and any member has the ability to set up a temporary conference with members of his or her choosing.

4. The final segment of the blackboard is the bulletin or newsletter of possible interest to the participants as well as staff reports or a daily corporate newspaper. There are some fundamental principles underlying the design of this computer-communication system of which the user should be aware:

1. One does not need to know computers to learn and utilize this system.
2. The user can make good utilization of the system after a short period of practice (approximately 1/2 hour).
3. There is nothing the user can do in the way of mistakes that will either hurt the system or cause the user more than a little time lost to re-answer questions. Thus the system is designed to be "forgiving".
4. The system is designed specifically to allow learning by trial and error.
5. The design is "segmented" (modules) so that the user can learn particular advanced features when the need or desire is felt for them.
6. Each individual's security is established by the use of a code that the person may change and by the fact that the system notifies the user each time he or she get on the system of the time and date that any of that individual's data was last changed.

In the conferencing section of the blackboard the system provides four modes of interaction which may be used singly or in combination:

1. The straightforward menu selection = i.e., selection an option from a list of choices;

2. A command mode which provides all the options in the menus and then some advanced features as well. All choices for any of the forms of interaction or use can be accessed directly through the computer such as what person or group is desired, what area of the blackboard is desired or what special action the user might want to take.

3. An anticipatory mode, where a user can answer questions ahead of time and avoid being asked a series of questions to accomplish something;

4. A procedure mode, where the advanced user can define his or her own commands by storing under labels preset answers to operations he or she often performs.

The system also provides a number of elementary text editing features for quick error corrections as well as some advanced ones for automatically formating tables, centering items, etc.

When compared to letters or teletype messages, the first item to note in the Conferencing Section is the common discussion file available to the group as a whole. Having this file in a computer allows each individual to restructure or develop subsections of the discussion that are of interest to him. Normally, the computer supplies each participant with whatever he has not yet seen anytime he or she gets on. In addition, the participant may choose to ask for certain specific individuals in the group. The computer also

allows users to write specialized messages which may be conditional in character:

1. private messages to only one individual or to a subgroup of the conference with the sender receiving confirmation of date and time of receipt by each addressee;

2. messages which do not enter the discussion until a specific date and time in the future;

3. messages which do not enter unless someone else writes a message that contains a certain key word;

4. messages which enter as anonymous messages, or under a pen name in either a private message or a public conference.

The possible variations are open-ended once one has already left the communication process the flexibility provided by computerized textual processing.

The next dimension the computer can add to the communication process is that of voting comments, which arise for participants to vote as a group. For example, a comment entered as a proposal would allow the group to vote on scales of desirability and feasibility. The computer would automatically keep track of the votes and present the distribution back to the group. Based upon discussion, the individuals can shift votes and reach a consensus or better understanding of the differences in views.

The computer also allows the incorporation of numeric data formats and the ability to couple the conference to various modeling, simulation, or gaming routines that might aid the discussion in progress.

NATURE OF COMMUNICATION

The system design is an attempt to replicate on this electronic blackboard the facilities a human being would normally utilize in communicating with other individuals about complex topics. It is believed that users of this system will experience a qualitative improvement in their ability to communicate and work with other members in areas of common interest. This is primarily due to the accessibility of the common blackboard to all members, the self-activating nature of the communication process, the hard copy, the availability of anonymity and pen names, the editing and formatting facilities offered on the computer, and the elimination of time and space barriers.

In practice, one should view computertized conferencing as the ability to build an appropriate structure for a human communication process concerning a specific subject (or problem).

In essence the key ingredient is the concept of easily dealing with "variable" information. Information that is subject to change and modification on a frequent but unpredictable basis.

To facilitate more equalitarian participation in discussion and better decision making we must acknowledge that many dysfunctional things occur in face-to-face discussions and decision-making meetings. Fundamentally the tendency is for one or two people to dominate discussions; this dominance is aided by several factors:

1. Only one person can "speak" at once; others are thereby reduced to the passive condition of being an audience.

2. Persons with high rank are deferred to; persons with low status but irrelevant characteristics have their contributions devalued.

3. The number of task oriented participants tend to "time-out" waiting for the meeting to be scheduled.

4. The press of scheduling means that a meeting cannot go on quickly for more than three hours without a break or meal; sometimes important matters get little consideration because they are brought up late in the meeting.

5. Verbally dominant individuals tend to reinforce their dominance with aggressive non-verbal mannerisms which further intimidate others.

6. Persons with jet lag are not able to function well.

7. There is no tyranny of the creeping clock unless desired.

Therefore, this unique type of rapid written communication appears to be ideal for the exploration and examination of complex issues and provides an atmosphere conducive to reflection and to reduction of psychological and/or social biases. Ideas can thereby be judged solely on merit, rather than on origin.

PACKET-SWITCHING FOR DATA TRANSMISSION IN COMPUTER NETWORKS

One of the relatively new developed communication technologies is packet-switching, which is a computer-based technology using a network of mini-computers, interconnected by high-speed transmission facilities and programmed to perform sophisticated switching, interfacing, and error control functions. Through powerful error-detection methods, qualitative defects in transmission facilities effectively disappear; and because of the extremely efficient use which packet-switching makes of transmission facilities, the cost to the user has been significantly reduced.

ers the network through one of these mini-computers,

bdivided into "packets" each of which contains the
dress and error control information. Each packet is
buted through the network over the optimum meaning
path existing at that moment; the packets are
to their original order at the destination mini-
re delivered to the addressee. No physical end-to-
between the sender and receiver is created; rather,
nnection is established and, as perceived by the
sion through the network is essentially instanteous.

nformation Services, Inc. (GIS) will help to extend
al coverage of the packet-switching network, such as
Telenet, on a global scale, from which extended
then increase aggregate of demand, thereby bringing
ffectiveness to end-users as well as larger revenue
f information services through the network. Such
demand by the public packet-switching network may
d to distribution system of commodities made by
n system. Here, the commodities correspond to
rvices and the mass production system to the
lities (or host computers) of subscribers of the
.

y, this has the advantage of making very efficient
igh speed lines connecting these different cities.
based upon the number of users in a city with the
nversely proportional.

rth, we will increasingly be living in a world in
l and ideological ideas become of less importance
ic and technological facts and information.

Computer communication networks now provide cultural experiences shared by all people in a manner unparalleled in human history. Thus enabling a common cultural environment to be diffused worldwide.

COSTS

nputerized communications revolution" is being
many analysts as inevitable on cost bases alone,
any other impacts that may accompany it.

t of EIES is estimated, at a population of 300 users,
dollars per connect hour. Three dollars of this
LENET charges. For 800 or more users the cost would
five dollars. First, this is obviously cheaper than
e phone call. More startling is that if 15 people
icate as a group by utilizing the mails and copying
s to one another, it is cheaper than mail for what
ished at the terminal in an equivalent time span of

effort. The technology we have been describing is competitive in costs with mails and without the delays involved, and certainly offers capabilities impossible through the mails.

Of course, there is no comparison at all with the cost of flying people into a common location for a meeting and feeding and housing them for any period of time.

The system developed by Turoff would result in lower costs because it is time-saving. Individuals could work independently under this system, rather than having to listen to a series of people talk at a meeting. For example, presently ten people who all worked in the same building, and whose time was worth ten dollars per hour per person, would save money using the computerized conferencing system rather than calling a committee meeting. Raising a person's value to twenty dollars per hour would drop the number of people to five for an economic trade-off. Time or money for travel, of course, further favors computerized conferencing.

Moreover for Hawaii, low costs, off-peak time for computing and data retrieval in the Mainland will be available at very attractive rates to Pacific area markets at the prime time of the Pacific area. This is because the cost of Trans-Pacific packet-switching communication will be only a fraction of the peak-time cost of the computer system.

There is little doubt this form of communication will spread widely in the ensuing decade, not only for researchers but for a wide range of application areas and reflect many alternative designs for differing applications.

It is starkly similar to the early days of the telephone where the limitation was who had phones. Today the limit is who has terminals. However, the cost of a terminal should drop to 300 to 600 dollars by 1980 (incidentally this is current cost of available kits) and will then begin to open up the possibility of widespread home terminals and possibilities for working at home a significant percentage of the time.

SOME IMPLICATION AND CHALLENGES

FOR POLICY AND PLANNING IN HAWAII

1. We expect in this environment a much greater use for individuals to move into new research areas and for new research groups to form up and other ones disband.

2. We also would expect less dependency of a good researcher on his or her home base.

3. A small college could attract top notch people without a tremendous capital investment in library holdings and support staff.

4. Or, conversely the researcher at a small institution would not be at as much disadvantage as today in terms of local resources and colleagues to relate to.

5. Professional meetings would be able to orient their programs to a greater degree of discussion and workshops and very likely emphasize smaller but more numerous gatherings, with discussion and workshop agendas prearranged.

6. Further, a bigger say in policy-making reinforcing motivation of members.

7. Presently a nationwide computerized conferencing system of groups of natural and social scientists is being established by N.S.F. to evaluate its impact on scientific communications and productivity. Among the issues are the impact upon the development and resolution of scientific controversies; upon the overall stage of paradigmatic development; upon the social structure of the specialties; and the facilitation of inter-disciplinary communication and research--the invisible college concept.

8. The primary benefit brought by packet-switching network is to enable remote end users the sharing of resources; communication facilities, computer hardware and software, and even human "brainware".

9. Global Information Services, Inc. will add another category, international marketing capability of the resources which can be shared not only by the end-users but also by suppliers of other resources.

10. Analogous to substantial cost reduction of expensive international communication to be made by the use of packet-switched network, high cost of international marketing efforts of information services can also be shared and subsequently reduced by the utilization of GIS's services.

11. Technology of computers and of data communication is improving so fast that the trend towards new kind of white collar jobs will continue and accelerate.

12. Time-sharing, Remote Data Processing, and the "Information Based" Economy are three trends which bear upon the nature of future job opportunities.

13. Corporate operations represents one of the biggest potentials for this form of communication. Whereas elsewhere the chief problem is perhaps the lack of awareness.

14. Further Decentralization of Corporate Structures is bound to occur.

15. Executives who adapt to the new communications tool might find that they can become much better informed and much more able to try out controversial ideas than ever before.

16. Computerized Conferencing allows the lateral coordination necessary for decentralization of authority with a speed and efficiency not possible with other communication systems.

17. Ongoing transcripts of all conferences among middle managers permits monitoring and/or intervention if an unwise decision seems imminent.

18. Chief executives reluctant to introduce a very new or different idea into a face-to-face conference for fear of losing respect or esteem or of swaying decisions by virtue of his lofty rank, would not be inhibiting factors present in the Computer Conferencing.

19. With the notebook and editing facilities of EIES, a person can produce and send presentable letters, memos, articles, etc., without a secretary. In addition, much of the traditional "filing" function can be done electronically.

20. Board of Directors could become more heavily utilized as a resource, contributing real expertise to the formation of corporate policies.

21. In this era of "Corporate Social Responsibility" and stockholders suits it is wiser in the long run to enable and assure such a broad range of viewpoint.

22. Accountability and culpability for these officers becomes clear.

23. Computer Conferencing could replace the face-to-face job interview.

24. In addition it would avoid discrimination charges creeping into judgement.

25. Flexible work hours become more viable.

26. Remote or home work locations become more pragmatic.

27. Substantive impact on decision-making processes and participation can take place. Once you change the communication structure of an organization, you inevitably change also the nature of the decision-making process within it and the kinds and quality of decisions that are likely to result.

28. The implications for Alternative Organizational Structure are dynamic. The organization system model: symbolized by mathematical models and the flow diagram featuring a feedback loop

becomes more feasible. Information, influence, individual and resources are seen as dynamic variables which may be allocated and re-allocated to various functions and problems in order to maximize the organizations ability to deal with the changing environment (i.e. macrosystem) and with changing priorities over a long term.

29. Such a system-oriented organizational form will become necessary in the future, based upon "adaptive", problem solving, temporary systems of diverse specialists, linked together by co-ordinating and task evaluating specialists in an "organic flux".

30. Project management conferences would provide a complete written record of all specifications, changes, clarifications, and suggestions that took place in addition to providing complete accountability if ever needed.

31. There will be more and more written records created and stored electronically in computers. Handicapped adults could thus do useful work at home, on a "piecework" type of basis, if necessary, working at those times that fit into their routines.

32. The public should have a right of access to information and information technology if it is to have an equal voice with those institutions that can afford these benefits.

33. The one reason one wants to put advanced technology in the hands of the public is that it is increasingly difficult to exercise the privileges of an intelligent citizenry in a democratic society without an understanding of the capabilities and limitations of the technology which is beginning to monitor, regulate and perhaps control aspects of our society.

34. A key issue seems to be: Will the utilization of this technology by society be such that each citizen must have a right of access and availability in order to function as a part of society? Suppose today we took a group within our society and denied them use of the telephone? One could easily list a set of severe consequences for such a group.

35. One way of immediately beginning to make Computer Conferencing available to the poor who are not mobility-limited is to place terminals in libraries:

The library is an institution that is available to the public, its personnel are familiar with serving the public, and it is relatively neutral with respect to political, social, ethnic and organizational polarizations. From the point of view of a person who is interested in delivering computer technology to the public, the library is a convenient place to do it.

36. The library is an institution for allowing people to utilize information. Utilization implies not only storage and retrieval, but creation, organization and manipulation as well. This itself implies a host of information services.

37. Technology is an influence in widening the gap between the disadvantaged and the rest of society.

38. If terminals and Computer Conferencing are made available to the public, they might help support new programs or social movements among the disadvantaged.

39. Computer Conferencing, computer-assisted instruction, and remote job entry on time-sharing computers could be adapted to serve the needs, and improve the opportunities and well-being of the handicapped, the aged, prisoners, and villagers in developing nations.

40. Thus these systems could be used to decrease inequity within and among societies. (The "Other America" and the "under- and-undeveloped" countries.)

41. These new technologies could be used to lessen the inequality of well-being in America and the world and an opportunity to help to equip the (disadvantaged) individual so as to become a participating member of a participant society.

The biggest advantage of Computer Conferencing is that it spans time and space barriers for disadvantage in particular providing:

42. Tutoring for handicapped.

43. Group therapy sessions for youngsters.

44. Surrogate grandparents - mobility limited older persons would possibly welcome the opportunity to be of help without the risk and effort of having to travel to do so.

45. Contrary to the public image only about 5% of people over 65 live in institutions. A very large proportion of older people live alone or with another older person and suffer from fear, isolation and inadequate services because their physical condition limits their mobility. Computer Conferencing could be used to tie together a network of older persons and community support personnel.

46. Provide for security, medical and social information.

47. The cost of owning and operating an automobile is rising faster than are salaries; esp. in lower income brackets. Computer Conferencing could thereby positively affect communication and transportation trade offs.

One can consider different conference structures for different applications - project management, technology assessment, coordinating of committees, community participation, parliamentary meetings, debates, multi-language translation, the list is endless, ...In general, computerized conferencing appears to be a more attractive alternative than other forms of communication when any of the following conditions are met:

1. the group is spread out geographically;
2. a written record is desirable;
3. the individuals are busy and frequent meetings are difficult;
4. topics are complex and require reflection and contemplation from the conferees;
5. insufficient travel opportunity is available;
6. a large group is involved;
7. disagreements exist which require anonymity to promote the discussion (e.g. Delphi-discussions) or free exchange of ideas.

A MORNING IN THE COMPUTERIZED COMMUNICATIONS WORLD OF

MR. OILCO PRES: A SCENARIO

7:00 a.m. Upon rising, Pres logs onto his computerized communications system and requests the first line (showing sender, time, and subject) of all private messages which have arrived during the night. After shaving, he glances over them. Most seem fairly routine; but one begins, "Mediterranean Hijackers ask $10 million ransom for our L.N.P Supertanker and Crew".

Pres. asks for the full text of this message, plus his schedule for the day, which is always delivered to him as a private message from his administrative assistant the first thing each morning. There is a meeting scheduled with the Chairman of the Board at 10:30. Good. He sends messages for the company's Vice President for Middle Eastern Affairs and Vice President for Governmental Relations to join them, to consider what action shall be taken to respond to the situation. Copies of the situation report and the meeting announcement go to the Department of Defense and the Department of State, and the Executive Offices of the President. He sets the meeting to last through noon, shifting his scheduled 11:30 meeting until 2:30 and sending a message to the three prospective attendees.

7:30 a.m. During breakfast, the terminal prints out the Company "Daily Bulletin", which Pres. takes with him to read on the train.

9:00 a.m. Once at the office, Pres. requests his assistant to retrieve the full text of all private messages waiting for him. He notices five of the six persons to whom he has sent messages about the 10:30 meeting have received the messages. The Dept.

of Defense notes that it has also informed the Israeli army and that it will send advice by 11 a.m. He telephones the sixth person, then begins entering an agenda for the 10:30 meeting, listing the possible options. Copies are sent to the legal and treasurer's department, with requests for comments by 10:15 a.m.

9:30 There is still an hour left, so Pres enters his "Government Regulations" conference, where he, six other oil company presidents, and respresentatives of the Congress and the President's Office, and public interest groups have been discussing a proposal for a natural gas rationing plan. He enters his vote on several propositions that have been made, adding associated comments on two of the votes. Then he enters a two-page position paper which had been developed with assistants and stored in his notebook, and now seems appropos.

10:15 Before the 10:30 meeting, he does a quick search of all files on "hijacking," and "kidnapping," receiving the text of information relating to case histories and policy statements on the subject that have been entered in the Industry President's Policy Conference. A private message arrives from the Corporate Treasurer, informing him that a $1 million payment could be provided immediately in dollars, Swiss francs, or gold, should that seem necessary, but that $10 million would take at least one day to gather together.

10:30-12:00 During the course of the meeting, further responses arrive from the Dept. of State and Dept. of Defense, which are brought in by the administrative assistant. It becomes clear that there are really only two viable options. But it's going to be another long day. Before leaving for lunch, he receives a message from his wife on the terminal, reminding him of the dinner party tonight. He jots down a note and leaves it for his secretary: "Tell her no; but say it diplomatically".

"INFORMATION FLOW--INTO, ACROSS,

OUT FROM HAWAII"

Miles Jackson, Panelist

In Hawaii, citizens need information of great variety and from many sources to function successfully in their daily lives. We know that despite the wealth of information available, large numbers of our population experience information deprivation.* Quite often in Hawaii these segments of the population lack survival information on social welfare, employment opportunities, physical and mental health, consumer and public health and just about every type of information related to satisfying basic human needs.

In the government and private sectors in Hawaii, information needs cover an extraordinary range: legal and socio-economic affairs, scientific and agricultural research, education and culture, the humanities and the arts. Much of the information consumed flows from outside into Hawaii, an addition to that generated in the State.

Libraries and information centers are the institutions that are largely responsible for storing, organizing and retrieving information. In the State there are presently over 400 libraries of various types providing a variety of information to a diverse clientele. But it is the public libraries in Hawaii that have a specific mandate to provide for the information needs of the people of Hawaii. This is being done by (1) operating 43 community libraries on six islands, (2) maintaining a central collection of resources for information services on a statewide basis, and (3) maintaining a government publication depository and distribution service.

At present libraries in the university system are providing services to over 60,000 students, faculty, researchers, and administration. In meeting the information needs of these varied groups the libraries have had to revise, in many instances, its system of organization, storage and retrieval of information.

The libraries of both the public and university systems are utilizing communication technology. The State Library, for example, is in the first phase of computerizing all of the bibliographic records of its holdings and the State Supreme Court. Eventually this will be an interlocking system linked by computer

*This is based on preliminary data from the state-wide survey of library users being made by the State Library System. The speaker is a consultant for the survey.

throughout the State. The five-year plan calls for an automated information delivery system, ordering through computer services books and other types of information resources from the Mainland. There is at present teletype services between regional libraries on the other islands and the central library on Oahu.

At the University there are on-line computer links with several data bases on the Mainland. The Hamilton Library through its services for Tropical Agriculture and the Health Sciences has access to several million bibliographical resources. The Graduate School of Library Studies also has a computer tie-in with Lockheed's data base in California for the Sciences and Social Sciences. The School sees the importance of giving future information specialists a background in automated storage and retrieval of information.

I am at present helping to plan a demonstration project that will link libraries in Hawaii, American Samoa, Trust Territory, Guam, Fiji, New Zealand and New Caledonia by satellite and teletype. PEACESAT, the University's satellite, has the capabilities of linking libraries in the Pacific into an information network. This network will have the capabilities of facsimile transmission. The demonstration will utilize a variety of channels of communication--satellite, radio, teletype, telephone, computer and postal service.

The Future:

Certainly before the year 2000 citizens of Hawaii are going to realize the importance of information for decision-making in their own personal lives. They will come to realize that just as Hawtel, Amfac or the Bank of Hawaii place a value on a management information system, they, too, will be dependent on information. The State Library, because of its centrality in the information environment, will be in a leadership position to coordinate a statewide network of citizens' information centers that will include organizing, storing and disseminating information from all Hawaii's State bureaus, departments and agencies. This statewide information infrastructure will consist of centers linked by computer terminals, teletype and video technology. Information will increasingly be delivered in microform and via facsimile transmission on a personal basis to the home or office. Hawaii's public information system will link not only Hawaii to the Mainland, but literally to the rest of the world. (Hopefully, copyright problems will be overcome by then.) An information infrastructure in Hawaii will mean we have put to work all of the latest in communication and information technology for organizing knowledge in the State. All of the disparate information activities will become a State resource for improving the quality of life for all citizens.

"INFORMATION FLOW--INTO, ACROSS,

OUT FROM HAWAII"

David Jones, Panelist

A number of years ago Congress passed a law called the State Technical Services Act of 1965, setting up a network for information dissemination throughout the country. The Federal government would match funds with states to set up information centers in order to get some of the information, gathering dust on shelves in libraries and government information agencies, into the hands of people who could make use of it. There have been a tremendous number of developments in the space effort, atomic energy and various other government and private enterprise projects. It was felt that a great deal of this was applicable to everyday use, and could enhance the economic development of the nation if it was made available. So the Hawaii Technological Information Center got its start as a project of the State Technical Services Program. After 1970, the Federal funding was no longer available but portions of this program continue under state and other funding to supply information in technology and other areas as a state function.

The State Department of Planning and Economic Development is very much concerned with communication for a number of reasons. The Economic Development Division is concerned with increasing the utilization of Hawaii's products. It takes communication to get products, ranging from textiles to agriculture products, well known, and to establish markets for them.

The Hawaii International Services Agency, another division of the Department of Planning and Economic Development, is concerned with international trade at various levels. It sponsors conferences on the many ways of establishing communication with business and government agencies not only in Hawaii and the Mainland but with other countries, such as those in the Pacific, as well. Hawaii is in a key position, because of its central location in the Pacific, to act as a sort of clearing house for information in international affairs. There's as much as 6 hours time difference between Hawaii and the Mainland and there's several hours time difference between Hawaii and Japan, for example. The time difference, however, between the mainland United States and Japan is even greater. So, there is very little overlapping, if any, of working hours between Japan and the United States. Hawaii can sort of mediate because it does have some overlap in both directions. In the sphere of communication, Hawaii would be a good location to establish a communication network or a communication clearing house as it were.

Another division of the Department, the Technological Information Center, not only disseminates technological data, but also concerns itself with economics, statistics, and land use, all areas of interest to the Department of Planning and Economic Development. But far beyond that, the Center is concerned that reasonable prices for communications between Hawaii and other parts of the world be available. This leads to questions about rate structure and the technology of communications.

One little thing that I'd just like to mention is a report that was done about 2 or 3 years ago by Barber, Harms, Grace, and Richstad at the University that made one point I thought particularly germane. I don't recall the exact words but there was something to the effect that all too often technology was considered first in the communication field. The report suggested that it was high time we first consider the needs of the people, and thus establish a policy or set up policies for using the available technology to meet the needs of the people. In most cases, the technologies are available, so our largest task is to determine what our needs really are and to establish policies which will focus our technologies in light of those needs.

"INFORMATION FLOW--INTO, ACROSS,

OUT FROM HAWAII"

Dallas C. Williams, Panelist

Thank you for the invitation to join you today. As you may have guessed, it was a foregone conclusion that I would accept when I saw the theme of the meeting. No telecommunications man would miss the chance of going into orbit from a platform labeled "Hawaii's Communication Futures: Policy and Planning Issues". In a way, I feel like Charlie Brown, the character in Peanuts when he was asked to name his favorite day. Well, he said, "I have always been kinda fond of tomorrow." Tomorrow is, in fact, the favorite day in our business. We have been dealing with the future over the past decade. We will be concerned with it increasingly in the next decade and beyond.

The communicators must communicate. In short, we seem to communicate better with others than we do among ourselves. And the gap will probably widen unless we take positive action. I suggest we need a form--a clearing house where we can come together to examine problems of common interest. I propose a quarterly conference. We are all involved in a significant effort--to bring modern communication into greater use for Hawaii. Together, we can make our efforts go much further than we can separately.

The year 1830 has a special significance in human history. From it, we can date the beginning of the communications revolution. Organized society depends for its very existence on the transport of things, people, and messages between individuals, groups of people, and places. Until the 1830's the methods available for such transport had remained virtually unchanged since the beginning of civilization, depending still on muscle power, wind and water. It took as long, to send a letter or a consignment of goods from London to Rome in 1830 as it had done in the heyday of the Roman Empire, and their arrival was probably less dependable. Communications were restricted to beacons, smoke signals, and semaphore, as they had been for thousands of years. In the 1830's with the introduction of railways, the discovery of electro-magnetic induction, and the invention of the screw propeller, the world began to move and has continued to move faster and faster ever since. By the 1860's Jules Verne could send his hero around the world in 80 days. In the 1960's an airplane could fly around the world in time with the sun. Shakespeare's Puck declared that he could girdle the earth in 40 minutes; today, it would take more like 40 seconds.

So spectacular has this change been that we are constantly in danger of being left behind, especially so here in Hawaii. In fact, have we ever kept the pace?

I hope to stimulate your thinking and try to identify the different means whereby information is allowed to flow . . . Into, Across, and out of Hawaii.

Informational Flow INTO:

Telephone, T.V. Telegraph, Radio, Computers, Newspapers, Periodicals, Postal Services, Couriers, Facsimile, Cable, Satellite, Laser, Motion Pictures, Books, Records, Audio Tapes, Tape Recorders, CCTV, Video Tapes, Personal Conversation.

Informational Flow ACROSS:

Telephone, T.V. Telegraph, Radio, Postal Services, Couriers, Facsimile, Satellites, Laser and Others.

Informational Flow OUT:

Telephone, T.V. Telegraph, Radio, Computers, Newspapers, Periodicals, Postal Services, Couriers, Facsimile, Cable, Satellite, Laser, Motion Pictures, Books, Records, Audio Tapes, Tape Recorders, CCTV, Video Tapes, Personal Conversation.

Now that you are thinking about ways Information is allowed to flow. . .Into, Across, and out of Hawaii, may I suggest that we are approximately 19 years behind in some areas and much less in others.

Rate Integration, that is the same RATE for services in Hawaii as on the Mainland. We pay more for many services, I would like to mention just a few. Message Telephone Service, Public Message Telegram Service, Telex Service, Private Line Service. In September 1973 the FCC ordered full rate integration for Hawaii by March of 1974. . . As you know that did not happen, and in fact has yet to happen. It has perpetuated a situation which is unjust, and which may take years to correct.

Yet there are services available to the Mainland, but not available to Hawaii. They are: Datagram, Datacom, TWX, TELPAK-series 5000, Inward WATS, Infocom, DataPhone digital.

What can we do to improve the Informational Flow. . .Into, Across, Out of Hawaii? We must move into 1977 with a clear goal for Hawaii and its people. To formulate this goal we must continue to exchange new improved ideas as we are so doing today.

On the congressional side, the multimillion dollar lobbying effort that AT&T and the independent telephone industry mounted to push legislation that would curb competition and confirm the industry's regulated monopoly status may have backfired. Although the lobby lined up 174 representatives to cosponsor a bill called "The Consumer Communications Reform Act of 1976", the legislation got no further than committee hearings. A new effort is expected

in the new congress. The lobbying has stimulated an unusual burst of activity in the House subcommittee on telecommunications. The subcommittee's Chairman has set up a staff of attorneys and economists to revamp the Communications Act of 1934 in a "floor-to-ceiling" investigation, instead of accepting the industry bill. The staff has worked through the recess and plans to start hearings early in the next session. The Senate which generally takes the lead in such basic legislation is setting up a similar staff in its communications subcommittee.

I hope that this conference today will stimulate continued productive dialogue within academia, industry, and government so we can jointly work to solve the complex problems associated with modern day communications technology and its application to social needs.

COMMENTS AND QUESTIONS FOR PANEL #2

Question #1 to Williams--How can we get our state caught up?

Answer--I think that one way that we can do it immediately is to continually exchange ideas, thoughts and work together instead of each one of us going our own little way and crossing paths. There is another possibility coming up in the Legislature--a proposed Office of Telecommunication for the State of Hawaii.

Question #2--To what extent do the armed services utilize communication technique that as of yet are not available for public services?

Answer--No one present able to answer.

Computerizing Library Catalogs

Question #3 to Jackson--You said that many cultural groups are suffering from information deprivation. Why are the people who haven't time or been able to go down town to the central library, or to their communicty and school libraries more likely to buy multi-hundred dollar computer terminals for home or community centers in order to have access to information?

Answer--I realize that it is financially impossible but there would be other ways of tapping information resources other than computer terminals. For example, there is technology already available that provides attachments for television print-outs of news information.

Question #4 to Jackson--Who will use these? Isn't it so that the people who already subscribe to newspapers and already have access to libraries are the ones who will be the consumers of this information. Won't this pass right over the heads of people who are not now taking advantage of existing services?

Answer--From the study of users and non-users, we have the suspicion that the state is going to have to provide some other ways by which it can disseminate information to non-users. When I speak of the informationaly deprived, obviously I did not talk about the demographics of the matter. But I think other studies have pointed out that often these individuals do fall into the lower socio-economic category in our society. For example, we'll have to overcome language problems by delivering information packages that have been processed and put into other languages. It might even involve person to person interpretation of information and so forth. I didn't have time to get into all the variables that could come into the picture for delivering information to persons, but I think long ago we got away from the idea that if information services are to be utilized,

individuals would have to go to the facility where the information is being stored. What we're talking about is projecting that service outside of the storage facility. And of course there're many ways to do this. Bookmobile service is just one simple way we came across a few years ago.

Herbert Dordick's comment on above answer--We did some surveys in Los Angeles. (Although Los Angeles is an area with fewer ethnic groups than Hawaii, it does have very well-defined areas where there are black and Chicano communities as well as white communities. A few communities are mixed.) In doing surveys there, we found that people have a very good idea about what information they need, and they also know how much it's worth to them. By that I mean they will make visits to libraries and other sources of information until they've found what they were looking for. You can get some idea about the value of that information to them by the time they spend seeking it.

Secondly, we found that no matter what community we were in, the library was always very well known. In general, more than 60% of the residents of a community, regardless of whether it was a black, Chicano, or white community, had been to the local library within the last 6-8 months. The library was looked upon as a place to get information and to seek services. The greatest complaint was that the library did not have all the services people wanted.

Therefore, I don't think you should concern yourselves with terminals or any other kind of devices for the home because of the present difficulty in determining who will pay for them. Instead we can utilize public locations. I travelled through the Island yesterday and noticed there were many mini-city halls. We have 28 in Los Angeles, and they are used by people as information sources. Unfortunately, not enough people go to them, because these agencies do not have all the information necessary. I would guess the libraries and the satellite city halls are the first places to consider when you are trying to find a way of delivering information in the simplest possible way, even if it means putting it into newspapers. Throw-away newspapers are abundant around here, so don't forget the fact that people already do seek information through the phone, newspaper, t.v. and cable. I think the technological investments should be made to interconnect these information centers so that experts don't have to be at every one of them. A lot of these services can be done now. You can lease line from the telephone company, for example.

Question #5 to Dave Jones--Is there a way in which the citizens of Hawaii might mandate an Office of Telecommunications and do it before there are dire financial difficulties in the Islands?

Answer--Certainly there are possible trade-offs between communication and transportation. I can readily visualize companies such as insurance companies where a worker's physical presence is really secondary to the job he has to do. A centralized outlying office could be provided so that an employee wouldn't have to commute into town to do his job. He could do it from either a communication center in his home or from an outlying office, say on the windward side, that would be provided with a windward outline, which provide communication facilities, consoles, etc. In this way, commuting time and the amount of energy used would be at a minimum and the air pollution from buses and autos would be lessened greatly. Of course, there are some types of work such as repair service where a worker has to physically be present.

There are some political implications as well as personal preferences that might pose as barriers to such a plan; we do things in certain ways because we've always been accustomed to doing them that way. You set the technology here; we can make use of it tomorrow if the willingness and attitudes exist and thereby save a lot of energy.

Comment from Miles Jackson--The state library system in Hawaii maintains eight community library centers, and all of these centers have a media orientation directed toward video and other non-printed sources of information. I see this as an area we can rely on to an even greater extent. Certainly the state has recognized its importance.

"SKILLS NEEDS AND DEVELOPMENT--

MULTICULTURAL, MULTIMEDIA, AND ANTICIPATORY"

Syed Rahim, Chairman

Communication is related to many other fields, in particular to those activities in society that deal with production and consumption. I consider communication the central problem of human society.

In the future, more and more, we'll be concerned with communication. Physical activities will be taken over by machines. However, we human beings will become more and more involved in complex communication with machines. When we're no longer involved with production processes, we'll not have much need for organizing activities in terms as superior-inferior, or boss-subordinate relationships. As this happens, relationships between individuals will change.

I think the future will be different in two ways:

1. very complex relationships will develop between man and machine

2. very complex cultural relationship will develop between people, extending to international and, maybe, extraterrestrial relationships.

"SKILLS NEEDS AND DEVELOPMENT--

MULTICULTURAL, MULTIMEDIA AND ANTICIPATORY"

Gil Aldrich, Panelist

My interest in this subject is somewhat more limited in that I'm concerned with what the future holds for business, and in particular our business at the Hawaiian Telephone Company. We're also interested in the skill level and the knowledge level of the people that will be coming into the business world.

I'm not in the predicting business but as Mr. Dordick mentioned earlier there is a difference between predicting and forecasting and we're very much in the business of trying to forecast. One of our important goals is to determine what the more immediate future holds and how we can effectively and successfully deal with it. And one of the more important and urgent changes facing us now touches on computers, a topic which several persons have already mentioned today.

Business in general is becoming more systems oriented and cybernetically inter-related. In many cases it turns out to be processor oriented as well. In the telephone companies our switching systems also are increasingly processor oriented. This raises a number of challenges to us. I won't go into those challenges at this moment except to briefly say there is the need to design these systems so they will be successful and effective. There is increasingly the need to be able to troubleshoot and maintain and repair these systems, not as an individual device, but in a broader total system concept. Within such systems new problems arise that are not common to a single device alone.

One thing that I can say with a great deal of confidence about the future is that there will be change; constant change; probably rapid change. I think that fact alone places very heavy demands on educational institutions, both public and private. I would include training departments in that particular category.

One of the problems that we will be faced with is the proliferation of product types as was mentioned earlier today. This proliferation will cause some organizational as well as training demands and problems. Another problem that I'll mention briefly is the interfacing of interacting systems and the fact that they create far more complex training requirements than those needed for the individual products.

And another item is the impact on the users and impact on operators. We have the customers to be concerned with as well as the people who operate our systems.

Technological changes cause internal problems within the company itself. We should not overlook the economic practicality of these changes and also the effect that they will have on job structures as well as upon the people who have to live and work within these newly created systems.

One of the possible outcomes which occurs to me is that education may be coming to be somewhat disposable as are products. Some of the people this morning, one gentleman in particular, talked about businesses that find it increasingly difficult to innovate because by the time they would create a system that would operate successfully it would become obsolete and they'd have to go back and redesign it. Well, this is akin to the training and retraining problems facing many people. They invest a great deal of their time and effort in education and job experience only to find out suddenly that that their education and experience isn't very valuable any more. Educational institutions are going to have the requirement of re-educating people constantly. This raises some very interesting problems for the future.

"SKILLS NEEDS AND DEVELOPMENT--

MULTICULTURAL, MULTIMEDIA, AND ANTICIPATORY"

Carina Christian, Panelist

I'd like to concentrate on some educational needs related to public policy. My activities in Hawaii are connected with 2 aspects of communication: cross-cultural communication which extends beyond national boundaries and, to go beyond the limits of our own planet, extraterrestrial communication.

Our planet seems to be almost shrinking in size. 500 years ago the American continent wasn't known to Europeans. And now it takes about 5 hours to get from one continent to the other. I foresee the trip taking even less time in the future. There are many advantages to this progress, but in this stage we need more than a Henry Kissinger to go about and propagate understanding. Indeed, Kissinger's writings duplicate De Vinci's belief that "to know is to love." Cross-cultural communication and understanding are essential to our survival on this planet.

This implies education of the public, either formally as in the schools, or through concerned citizen groups, for example. The UNESCO Association of Hawaii, included among these, has as its main purpose the goal of promoting cross-cultural understanding. Education in the schools should emphasize to an even greater degree the study of foreign languages so we can communicate with one another, intensify the study of values of other cultures and civilizations and, of course, accentuate computer applications to facilitate communication.

The second topic I'd like to mention deals with extraterrestial communication. We are already doing a lot of extraterrestial communication, so this is not something of the future. We are using artificial satellites to study, for example, the agriculture of our own planet and to detect energy resources in the earth. The space shuttle that NASA is to put in orbit in a few years would actually create the possibility of commuting in outer space. As a result, we could easily have access to various space orbiters that exist already.

Last but not least, is the very high probability that civilized societies exist in outer space. In our galaxy the likelihood for advanced civilization is very high. Again, this is not a problem of the future but of the here and now. This is not science fiction anymore; there are certain projects going on now which will enable us at least to detect some other civilizations by receiving their signals. The skills needed to meet the science, some study of astronomy in our challenges of extraterrestial education communication will be derived from computer science, the study of the environment beyond our immediate surroundings, and astronomy.

"SKILLS NEEDS AND DEVELOPMENT--

MULTICULTURAL, MULTIMEDIA, AND ANTICIPATORY"

Gerald Dykstra, Panelist

I've chosen to say a few things about anticipatory skills development and a few things about Hawaii English Program's Skills Section.

I think it's worthwhile looking to the past. (And by the way the Hawaii skills program has looked into the past as well as the future.) Education very frequently trails the rest of our economy and society, perhaps appropriately so to some extent. However it does have and continues to have a large number of users in each new generation. I would like to emphasize the association that I see, which has already been mentioned this morning, between education and communication. It seems to me that the whole area of education is a sub area of communication and when we talk about educational goals, skills, affects and cognitions and so on, I think all of that is incorporated in the broader field of communication.

I'd like to touch on two things mainly. One, I'm going to head with the term "resource," the other with the term "system." Education as a resource was mentioned this morning and reference was made to Stan Harms' work on the right to communicate. Mr. Dordick explained this in terms of choice. Furthermore we had Jan Huston talking about peer group communication. Now, keeping those in mind for just a minute I'd like to refer to an experience that happened a couple of weeks ago. My five year old boy came to me and started telling me all about babies. He had dialed on the telephone and gotten the message. A little later he had heard about some trouble I had before and came to tell me all about hemorrhoids. Apparently you can just about get anything from the telephone if you just have "dial literacy".

Now, I think from there we go to "keyboard literacy," and I come to my own experience of earlier in the day when I went outside to the computer terminal here, and I asked, rather innocently, "well can you get anything else besides the information on what's happening at this conference and about the people who are in this group?" The response was, "oh sure. What would you like?" I said that I didn't know. So he dialed a little number and out came a whole stack of things one after another. One was biorythms. I was asked, "Do you know what that is." Well, I lied a little bit and said, "yes, but let's find out." So the operator asked my birthdate, put it down, and out this came in about 30 seconds. It shows that my intelligence is at its absolute nadir today. However, my emotions are at their peak! Well, that you can get with keyboard literacy, and all I had to know was how to type my name and birthdate.

Let's go a little bit further and look at some things that were also mentioned this morning. Mr. Dordick talked about data and the desirability of connecting the libraries of the state. Miles Jackson talked about data from the libraries throughout the Pacific. I would like to emphasize the idea of a connection between the schools in the state and the possibility of each individual being in touch with each other and also the idea that each individual is a communication resource.

Now coming to the area I headed with the term "system," let me say a little bit about the Hawaii English Program. The most common complaint that I hear as soon as I mention that I've been connected with the Hawaii English Program Skills system is, "How come our kids don't read any better?" I guess since my emotion is at its peak I will briefly mention that they do read better. You just haven't seen the right studies. In the study by Frank Payne we discover that in 16 out of 16 critical tests, where participants were separated according to the kids who were in the program from the start and kids who had never been in it, the program participants did significantly better. So, let's put that aside. That was not the real intent of the program. The intent was to see that kids didn't go down in their ability to read. The basic intent and the basic commission at the outset was to devise a system which could be continously upgraded.

So in looking at this from various points of view we can say the system is a teacher's tool. It's a tool which allows for a much higher degree of individualization than was possible before, a much higher degree of learner participation. For example, the learner can decide what he will learn at any given time. But it's also learner participation in a more immediate and more constant sense. In traditional school systems the child interacts with a stimulating person only part of the time. We were trying to design a system in which interaction is constant--in other words, one in which there is a high density of active participation on the part of the learner. He's committing himself in making a response at every moment and checking to see if it is an appropriate response.

Another aspect of the program is a high degree of media use, and a wide range of this use. It includes the opportunity for training in keyboard literacy from kindergarten on. There's a high emphasis on peer exchange. In actual use, the idea of peer exchange means that not knowing how to read is no longer a deficit. This is now part of our bank, or part of our wealth. If we find a child who doesn't know how to read but who wants to read, this is an opportunity for another child to help the learner select a program. The two of them can then work toward reading at the time when the learner wants to learn to read. So, there are high degrees of freedom and the ideas of communication are fundamental here more than anything else.

Well, let me go quickly to the idea of the system as a community tool. Accountability is built in so that you have a very close relationship between the goals, the cues and the

tests. You can tell at any moment precisely where a child is, what he can do, what he can't do, whether he can read or understand Love Story or any other novel you may name, etc. This is the kind of thing we have talked about in the educational system but I think we have not so often been able to get close to it.

Looking into the future, I would say that I think there is a real possibility that instead of having the order of elementary, junior-high, high school, college and general society, we might want to continue with some more general categories: The categories would be less distinct, and they might be ascribed the numbers 1, 2, 3, 4, 5 to diminish the emphasis on the amount of grades and years that one spends in any one stage. One would work presumably with considerable emphasis in the first stage on such things as basic affects and skills in learning. This would be achieved through interchange. At a second stage somebody would become qualified to participate in developing the programs to help others achieve these individually. Again the emphasis would be on interchange. The third stage would be interchange of cognitive results where the students develop their own learning programs, their own discovery programs and interchange their findings. The fourth stage would, with professional contributions, make reference to societal needs and the entire area of social institutions and would include longer range work.

"SKILLS NEEDS AND DEVELOPMENT--

MULTICULTURAL, MULTIMEDIA, AND ANTICIPATORY"

John Southworth, Panelist

I felt a little uneasy today. Maybe it's partly because as a teacher at the University I have difficulty in handling the future; when I stand in front of the class, those students are there, now. I think my orientation also comes from being in the science department which teaches the empirical approach. That means doing it. Our edu-comp program functions in this manner; we try and work with what we have now. While it may not be the best possible system, we use it to get some experience. That's one reason we have the Computer Information Central (CIC) available for your use today. The activities you see today are made possible by undergraduate students who programmed the computer.

This brings me to an important point I'd like to make about the basic skills needed in this area. One of the first things a novice thinks about when he approaches a computer is how to program it. But let's step back for a moment. Let's imagine all the people who go to the library; how many go there thinking they'll write a book, make a movie, etc.? These are only a few possible uses of library services. In order to make the computer as accessible an information source as the library, we are attempting at the University to give our students exposure to the computer. Indeed, it was stated ten years ago that any student leaving the University without having had a direct exposure to the computer was not being provided adequate preparation for today's and tomorrow's society. I think we're seeing that come about. In addition to the minimal skills required to use the computer as an information source, I feel that the technical aspects of skills training such as programming will become more and more important, and can be incorporated in various ways.

QUESTIONS AND COMMENTS FOR PANEL THREE

Question to Mr. Aldrich--You mentioned the problem of proliferation of product types causing more organizational and training problems. I believe common carriers, specifically the telephone companies throughout the U.S.A., and I imagine the world, up until very recently placed a legal moratorium on the interconnection of foreign devices. If there hadn't been a moratorium might not some of this proliferation have happened a little earlier, getting it out of the way sooner? Now that many of those restrictions have been lifted, now only requiring a form of buffering device for electro-mechanical protection, are we going to witness this proliferation and will the telephone service suffer as a result? Or is this proliferation good in the sense that we'll get all of our R & D over with so that maybe in 10 to 15 years, we may emerge with an agreed upon technology?

Aldrich--From the remarks that were made this morning I don't think too many people would agree that in 10-15 years we're going to have it over with and then settle into something stable and comfortable. I don't think that a change in the law is going to cause some sudden rush of proliferation which then diminishes and the problems disappear. I suspect that these problems will be with us for a long time. The problems that I'm particularly talking about relate to the system interface. It's relatively easy for example for a company or manufacturer to train their people to install and maintain their particular devices. But these devices have to work in a system with other kinds of devices. To the extent that there is an increasingly wide variety of devices you probably would find that you have increasing problems in trying to find people who can really relate that system to the total system or network. And so you're going to have people that can work on their own devices but increasingly have problems trying to identify and resolve the problem that is inherent in interface.

Question 2--What is the solution?

Answer by Aldrich--Again I don't know if people would agree with me. I might say that in my opinion this country has achieved such a remarkable communication system because of the way it was designed and the way it evolved. It evolved in a very well-planned evolutionary manner. Changes were carefully incorporated into the system, compatability was always given very high priority. And these interface problems that I'm alluding to were relatively few. I feel there's great merit in that, in something as complex and as pervasive and as important as many people have stated here today. I feel that perhaps the community will be well served to take a planned approach to make certain that the system works very well all the time and not be too overwhelmed by the first blush of having new color devices or new types of devices appear on the scene and

have everybody think "Gee, this is a good thing." In some respects it is good but may carry some serious penalties with it in the long run.

Question & Comment 3--I'd like to pursue the same thing Gil, you were talking about the obsolence of education and I think you meant vocational training rather than education?

Answer--Well, I suppose you're right because I think most people would accept education as being cumulative. In some respects vocational training can do that but even in education a lot of people who graduated 20 years ago are finding out that the' education they received then isn't quite adequate for whats happening today. Many people, many of us I'll say, are going back to college in trying to learn the latest concepts, methods and technology.

Comment--I think that if you have a basic education in electricity, physics and mathematics and you're not just trained for these newer technologies, then they come easier to you. You take a man off the street and tell him how to engineer cables and terminals, well, then he has problems.

Comment from Aldrich--You're correct, I wouldn't disagree with you except that people who have an education in electrical engineering and who might have been very competent in the electronic age now suddenly find themselves entering the processor age. So now we're talking suddenly about software systems and how to design and troubleshoot complex systems that are a combination of hardware electronics and software. So, we don't find people who bring that kind of experience to the job too readily.

Comment by Christian--I was thinking that perhaps we should change our approach to education. Rather than consider education as the amount of knowledge someone accumulates, we should consider it as an attitude, a dynamic process. Once somebody has been given the elements of understanding of the basic concepts, it should suffice to stimulate the curiousity keeping one constantly updating and such. Education should be a dynamic and constantly happening process.

Comment by Dykstra--I can only second that and I think that the universities and colleges of the community can do a great deal in order to facilitate that.

Question to Dykstra--You suggested that schools be interconnected. When the cable t.v. franchises were handed out five or nine years ago it was presupposed that schools would be able to use return channels and would be interconnected. But this hasn't happened. I suspect the money was not forthcoming from the departments of education and the University of Hawaii to actually connect and wire the schools. For instance, Punahou is wired and St. Louis is wired but these are private schools with private

sources of funding. The public fund has not been sufficient to wire the public schools even as fast as the private schools were able to do themselves. Since the longer we wait, the higher this cost goes, do you continue to propose to do that? Or do you suggest some new way in order to bypass the older technology in getting on to something newer and more sophisticated?

Answer--I would suggest you ought to do it right now. My suggestions don't carry terribly much weight. I was called in as a consultant for about a 5 year period to prepare a program that was done and then they got rid of me in that aspect of development.

Regarding the idea that there should be interconnection, I think it is very important and it could be used in a great many ways with the programs that are now in the schools. There's a high emphasis on interchange between peers and the process of education, rather than the product, becomes an important aspect of it. I don't know what I can say about it other than that it should go that way but it hasn't.

Question--Can you suggest any ways of which the funds to achieve that might be released in the next few years in order to effect the change before the next generation of computer technology makes that obsolete?

Answer by Dykstra--Do we have an expert in Political techniques here?

Question & Comment by same person--Obviously there's a certain cutting edge to this question that I'm trying to get at. If we accept the fact that technology is speeding along, possibly as Mr. Aldrich says faster than the educational system where the business community is barely capable of intergrating those changes, then all this talk of altering our educational system in order to teach children how to use computers really has no meaning. There is no such thing. We're talking about something that doesn't exist. If you're going to teach children how to use computers, they have to have the computers today, not tomorrow! If you can't give it to them, there is no sense in talking about it, you might as well start with adults, who are motivated on their own to come to private or public schools of computer sciences, information sciences and let them trickle down.

Answer by Dykstra--When I mentioned earlier that we do have emphasis on keyboard literacy we have had to do it through typewriters not by computers.

Comment by Southworth--I think I can speak to the point. Perhaps it'll answer his question. You can have a computer but what are you going to do with it. That's Step 1 that we're trying to get now; looking at how you can use computers in a variety of ways. The University of Hawaii has a statewide computer based educational planning committee that's trying to

look at some of the problems and ways it might be done. We're trying to communicate with the Department of Education. They quote, "have other priorities", but are interested in this area.

I'm involved in a project some of you probable have heard of, the American Field Service. This is a program that brings students from overseas and sends people from here overseas for people to people contact. They live in each others homes, they go to school and so forth.

Well, we've gone one step further with this and have been able to extend contacts of the University group utilizing communication technology. Using the computer we publish a newsletter, for one thing. PEACESAT gets us together over the satellite helping us to share experiences. The most interesting and recent experience is the use of color slides which are duplicated and sent to each station so the student can narrate the slides 23,000 miles, or 46,000 I guess, by the electronic signal. And it really has fostered very close interaction.

The irony of this particular project is that we're communicating with AFS, people in New Zealand, Saipan and Roratonga but not in Maui. We are closer to New Zealand than we are to Maui. If we really have a statewide university system or educational system, why don't we get down and start doing it here.

Comment by Dordick--I wonder if I can address a question to you, Mr. Dykstra. I think your point Mr. Southworth is very true. We haven't even been able to use the technology we got. Educational television has been a disaster in the U.S. It never has worked very well and I think one of the major reasons is that it was introduced as a substitute for the teacher which was always a threat rather than as a means of assisting the teacher. In fact much of the research on educational television has focused on whether one can teach as good as or, as the research literature now says, at least as good as a face. Well that's not the objective of educational television. The objective was to offer the student a wider range of experience. And unfortunately the way educational television burst forth in the U.S. over a single educational channel, the teacher didn't have any options; they had one channel at a given time.

I think that what is changing now is the fact that, as I said this morning, there are a wide variety of alternatives available for use in educational systems. There are a wide variety of doing it by means other than the very expensive over-the-air channel. We offer the teacher the opportunity for choice, the opportunity of growing, the variety of programs or the variety of different pieces of information. The truth of the matter is that there is so much we can do now without concerning ourselves with a lot of the interactive technologies and a lot of the more esoteric computer technologies. We are able to bring more experience to

the students and lower the cost of education delivery, not necessarily to the detriment of the teacher. If you look at the figures for the next 20 years or so, we see a gradual drop-off in the number of young students at school. But it's interesting how some administrators today are looking at educational t.v. and all kinds of computer learning and electronic assisted learning as a substitute for textbooks which have gone up in price tremendously.

Now, with respect to getting schools wired. I don't know if you were referring to the old FCC rule concerning cable t.v. but there's no question, the FCC has backtracked considerably on allowing schools to obtain wiring and being able to get different channels. What the FCC's really done is to put the burden of proof on the school. The school has to go in and show just how they intend to use the channels and there are quite a few cases that have come out of the FCC recently where schools have obtained as many as five additional channels only because they came forth with a plan that showed how they were going to use each of these channels year by year plus where they were to get the resources. While I would object to the FCC backing off, I also feel it's the responsibility of the educators to show what they're going to do with the resource.

"PUBLIC INTEREST--PRIVACY, RIGHTS, EQUITY,

ACCESS, AND CITIZEN PARTICIPATION"

Kenneth Kupchak, Panel Chairman

I am here as that all too familiar creature, "THE CITIZEN"! I serve as Chairman of the Kailua Neighborhood Board - a City Charter created "Citizen Sounding Board". This is a communications device that our previous panelists might be forgiven for overlooking, following as it does closely upon the heels of the revolutionary communications discovery of the Greeks, known as democracy.

This conference is an example of such a citizen participation sounding board. It, perhaps, is an offshoot of the new awareness of the average citizens and their participation in the processes governing their lives.

A minature example began in Kailua, where, as Dave Jones suggested, the Chamber of Commerce and Community Council attempted to determine their goals and needs before embarking on developing the community.

Surprising uniformity of opinion resulted following numerous community meetings and the taking of various polls by developers, community groups and the local media. A vibrant high quality small town was sought. It became evident that this meant less of a dependence upon commuting together with the establishment of a climate and finding a means for attracting a core of non-polluting industries. Chance discussions with Hawaiian Telephone planners at yet another conference led to the establishment of a workshop to introduce Windward community leaders to a powerful planning tool known as telecommunications. This planning tool, we were told, could help create remote work centers in Kailua town or even in the home.

The Windward leaders, who were about to tackle development plans for their areas, were shocked to find that nowhere in either the overriding state plan and county general plan, then being developed to guide us for the next twenty years, were these tools being considered. The legislature had foreseen this for the enabling legislation specifically requires that communications be one of the major areas of concern which must be inter-related with the others.

The Council of Presidents also recognized that communications along with energy technology was one of the most critical planning tools. It, therefore, established a task force to educate the public and the decision makers. Among other suggestions, the task force proposed that the name of the Department of Transportation be changed to the Department of Communications. This simple change would significantly change the mission requiring consideration of all communications alternatives.

This conference might be considered an offshoot of that task force. Six of its members are participating as panelists and several more are in the audience. The daily papers have picked up the thread and are beginning the primary task of public education. And I'm happy to report that the City Council, has at the insistence of the task force, recognized the importance of telecommunications, at least in the area of potential transportation trade offs and energy conservation in the latest general plan draft.

Miles Jackson's talk on citizen information, storage, organization and dissemination is pertinent to this panel as would be information on the mass media. Gerry Sumida will give you a peek at the future, which may be largely planned without communications awareness. Then John McConnell and David Barney will look at portions of todays communications regulatory framework out of which the future may evolve. Finally, Edith Webster will provide a citizen's overview of the impact of communications technology.

Each of you, however, should not be just sitting here in this incestuous gathering of communications people. You should also be talking to the uninitiated which include the public decision makers with the State and county plans, now being formulated, tomorrow will be too late.

"PUBLIC INTEREST--PRIVACY, RIGHTS,

EQUITY, ACCESS, AND CITIZEN PARTICIPATION"

John McDonnell, Panelist

I am not really going to talk too much about the future but rather about the present, which I think is very important to the kind of discussion we're having here today.

First, I want to say what our agency (Department of Regulatory Agencies) does in the communication field, primarily in the telephone industry. We represent the consumers before the commissions that regulate the companies. In the case of intra-state communication that's the local PUC (Public Utilities Commission). In the case of inter-state communication it's the Federal Communication Commission.

I have no doubt that rate-base regulation is a great retarding influence on the development of technology in the communications field. I think it's important that you try to understand what it is and how it works. Because you can then proceed from there as to how it might change.

Rate base regulation is basically a cost-plus approach in determining the revenue requirement of the carrier. This is done by adding its expenses to the product of its investment times whatever return on that investment the regulating agency says it needs to earn. This type of regulation is expensive and it's cumbersome. Most of the key decisions are made in formal, legalistic proceedings in which the parties are represented by attorneys. The records can be volumes and volumes. The last telephone rate case we had is probably a foot thick.

Because of its complexity, the rate base regulation concept is one that has inherent difficulties for citizen participation. Because you are concerned with economic issues and with every facet of the operation of the company, it is very difficult for private citizens to meaningfully participate in these legalistic proceedings.

The regulated companies' direct interests are at stake. They devote considerably more time and expense to the regulatory process than we do. So it's not an easy thing, but we do have citizen participation. I noticed that representatives of STUC, the State-Wide Telephone Users Committee, are here today. They have participated in the local rate case.

For the last year and a half we've been undertaking a program to eliminate what we call telecommunication inequality, which Hawaii suffers, with respect to the services provided and the prices charged for those services.

In order to bring this about we participated in numerous proceedings at the FCC that have cost us a considerable amount of money, I think well worthwhile. I tried to check my files before coming over here to get a final total on the number of different dockets that we've had to enter at the FCC and it was just an impossible task. I don't know how many there are.

We have achieved some successes, having predicated our goals on the principal that with satellite communication there is no longer any justification for higher prices in telecommunication services between Hawaii and the Mainland than for comparable distances between Mainland points.

We were successful in getting three step reductions in long distance telephone rates. The first one occurred in March 1976, and, although we may have further resistance, one is scheduled for July 1977, and the final on January 1, 1979.

Before integration the Honolulu-California rate for video transmission was $1,175 for the first 10 minutes and $38.50 for each additional minute. It's now $250 for the first half hour and $8.33 for each additional minute.

Telex, before rate integration, cost $2.00 for the first minute, $2.00 for each additional tenth of a minute. As of January 1 of this year it's $1.90 for the first minute and 19¢ for each additional minute. Further reductions in telex are scheduled for July 1, 1977 and January 1, 1978.

For telegrams, we have succeeded in getting the per-word charge after the first 50 words reduced. It's 21¢ per word for the first fifty words. After that, it used to be 21¢ per word; it's now 10¢ per word.

For private line services, data services or alterate voice data as they call it in the industry, the rate to California is now $3,770 per month; to New York it's $6,038. We expect substantial reductions in the near future. The best example that I can give you to show that we're not regulating prices is that we have a computing company coming in; RCA, which has its own domestic satellite system. They propose a rate of only $1,200 per month to California and $1,400 per month to New York. And I think that's the difference between competitive enterprise and regulated monopoly. Sure there are certain cases where monopoly is required because the economies of scale involved. But once you've got it, you've got to regulate it. However, regulation is a very poor substitute for the competitive process. And my message would be that the kinds of things you are talking about can be developed through a competitive marketplace more quickly and more effectively than through rate base regulation.

In that regard (I think it was mentioned this morning) there's something called the Consumer Communication Reform Act

of 1976 now pending in Congress which is sponsored by the Bell Co.'s and the rest of the telephone industry. To call it a consumer's reform act, I think, is one of the greatest misnomers that's ever been created. What that act would do is reverse the recent decisions of the FCC that have permitted competition in the terminal equipment business and in the specialized common carrier area. I think that growth has to be orderly, and I can understand the telephone companies' concerns. But I think there's real room for letting innovation and competition work and allowing the industry to grow. A good example of competition's benefits is that of a small computing company which first came up with a device that enables deaf people to use the telephone. These kind of competitive pressures have had a very healthy effect on the Bell system because they've had to respond and they've done so very well.

"PUBLIC INTEREST--PRIVACY, RIGHTS,

EQUITY, ACCESS, AND CITIZEN PARTICIPATION"

Gerald Sumida, Panelist

I thought it might be useful, or at least interesting if not useful, for me to read you a letter which I just received. It says:

Dear Jerry: In your last communication, you asked me to describe my views on the "communication age," which I am happy to do. Incidentally, I was somewhat surprised that you prefer a letter to the more expressive holotape.

But to your request: The most technologically advanced societies entered the communications age in the latter 20th century. By then the earth was linked by several networks of ground and orbiting communications systems, and miniaturization techniques made possible the mass production, at relatively inexpensive prices, of all manner of computer, information processing and telecommunications devices. Obviously, central governments, military establishments, and the larger corporations were the heaviest users of these devices. But before the mass telecommunications systems were taken over by government corporations, the privately-owned communications systems reached into virtually every human habitat, and literally turned them into individualized entertainment and amusement centers. The real breakthrough came when the screen system could be used for two-way communications with holographic projections. [Some governments, before the regional wars, apparently used the screens to reach persons who were immobile or shut in, especially in the decayed urban areas, and made their lives a bit more pleasant.] Of course, books, magazines and other printed stuff were almost all replaced by the individual communications unit, which really revolutionized matters. If you wanted to read a book (instead of experience it by dream induction or learn by hypno-immersion), you could simply signal a central repository and the pages of the book would appear on screen, as long as you wanted. All the big publishing companies went out of business, but not before some political and legal battle royales against the telecommunications corporate giants. The battles involving copyright and patent questions would fill volumes. Newspapers, of course, were the earliest to go on screen, starting when the New York Times merged with CBS in the last quarter.

These societies were profoundly changed by the communications era. Central governments became all powerful corporate administrative units, with each citizen linked directly to the central human resources department. Everyone had an electronic ID card, which some governments had implanted in a person's brain at birth.

Some of the historic democracies tried to use various sorts of electronic voting systems, achieving for a while a kind of direct democracy, and attempted to work new balances between government information systems and individual privacy. The historic autocratic societies, however, skipped this particular experiment.

Few people anticipated the total power shifts that the communications age caused in all countries, regardless of their professed ideology. A new elite class emerged, whose wealth and power derived from their knowledge and experience in making the communications society work. These were the superscientist-technicians and superplanners, whose scientific reasoning and decisional capabilities were enhanced by genetic engineering techniques. The traditional political elites lost out simply because they naively thought they could control the communications elite, and because decision-making in this period became so complex that most of society's central decision and maintenance processes were handled by national guardian computer systems. The link-up of the guardian systems of the United States, Canada, the Soviet Union and Japan, while done under compelling global necessities, was an effective political coup d'etat.

The traditional corporate and business elites lost out because information became the new currency and form of wealth, and determined the rank-status-power relationships in society. Of course, the few large government corporations responsible for various aspects of each country still have corporate managerial-administrative types, who were able to adapt to managing a very different type of corporate enterprise.

The later stages of the communications age were not always readily accepted. The neo-Luddite revolts in Southwestern United States, England, Northern Europe, the Soviet Union and Iran, to list the most prominent, which destroyed a good deal of expensive equipment, were not major setbacks to the establishment of this new order. With the passing of the older generations, the new era became firmly established.

By the beginning of the last quarter, the terran guardian network handled most of national and global affairs and had replaced the United Nations system which by then had proven to be quite cumbersome and ineffective. Besides, as soon as the United States and the Soviet Union were linked, the whole global power system changed, and the terran guardian network became almost omnipotent. Had it not been for the outbreak of the regional wars, which ended after the destruction of the orbiting weapons systems, I am sure that all countries would ultimately have been incorporated into the terran guardian network, whether voluntarily or by coercion. As it is, the United Nations was resurrected in the form of the Terran Council, which had important legislative and enforcement powers.

Immediately after the terran guardian system was damaged, Earth II was created by persons from many different countries. Earth II, which is in orbit around earth, administers itself as a pure democracy. As I understand it, any member of the elected council may call for a vote on a matter in issue. All monitor screens then shift to the council, where each side presents its case, with the central computer giving confirming or disconfirming comments on the arguments made. Everyone then votes, and, depending on the seriousness of the issue, a majority prevails. Earth II has recently been designated a sovereign country by the Terran Council.

Part of the foundation--in my mind the most crucial element of the Terran Council and Earth II was built by the tremendously innovative work of the early Terran Communications Center, which was established in Hawaii as an outgrowth of an idea of Theobald and Scott. Anyway, the center was established with extensive information-processing and telecommunications capabilities in order to engage in global problem-solving activities. [Its information banks systematically stored data received from all over the globe, which were used to create exact simulations of regional and global problems. Proposed solutions, alternative courses of action, anticipated future problems were the results, which decision-makers could then act upon.] For some fortunate reason I still don't understand, the center was never integrated into the terran guardian network established later. The center was finally taken seriously when, after its repeated warnings, the Pacific economic war broke out among the corporations and countries trying to divide up the manganese nodule beds. The center proposed an equitable solution which was accepted and adopted by all parties. Thereafter its credibility became virtually unassailable. Later, when Hawaii finally seceded from the United States as the only way to preserve itself as a rather unique and unusual society (instead of being largely overwhelmed politically, economically and culturally by the United States), the center played an even larger role in Hawaii's life. When I last visited there, Hawaii had just been formally designated by the Terran Council as the major center for Pacific Rim terran affairs. This has enabled Hawaii to play an enormously important role in terran affairs slightly resembling that played much earlier by Switzerland.

I must close now, and I promise to continue my narrative in my next communication. Until then, I remain with you in Terran kinship.

(Transcribed from a Future Time.)

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"PUBLIC INTEREST--PRIVACY, RIGHTS,

EQUITY, ACCESS, AND CITIZEN"

David Barney, Panelist

Today, we've heard a great deal of talk about some very sophisticated, expensive, hopes, predictions and/or forecasts, libraries, schools, and extraterrestrial explorations. If we turn our attention back to Hawaii and take a look at cable television, I think we can see a problem developing that's going to impact not only cable t.v. but other areas of communication as we get more and more technologically sophisticated. The problem of who is responsible to ensure that people are served by communications and not the other way around.

I'd like to take a quick look at cable television here in Hawaii and make a recommendation that we all could perhaps adopt and perhaps work towards.

I'd like to talk just for a second about Federal impacts on cable t.v. The Federal Communication Commission traditionally has been in favor of broadcasters. And I think you can see that in a number of ways. First there is now on the mainland restrictions in major markets and others on the importing of distant t.v. signals into a community. I think this violates the individual's right to selection. Secondly, there was a moratorium for a number of years on the construction, in the major markets, of cable t.v. systems. I think that was done at the behest of the broadcasting corporations. And I think that again it made the public suffer. Thirdly, there is currently a slackening of interest on the part of the FCC toward the whole area of access. Initially there had been requirements for at least 3 access channels for each system. Now there is a requirement for one. And that experiment is due to lapse. We're going to find that there has not been enough experimentation in this experiment for a number of reasons. I think the Department of Regulatory Agencies here in Hawaii has been a little more responsive than the Feds as we are still requiring 3 or more access channels. I think we should do a little more probing into the DRA and see what their response has been so far.

I haven't seen very much interest manifested through the DRA or anyone else in government at the state level in finding out what actually has been going on in other places in access. I think there have been a number of excellent examples of what can happen with access. Experiments in Redding, Orlando, New York City, have been very interesting. There are some California experiments underway that are very good. We haven't seen any direction so far from the Governor's task force on cable t.v. I think we should watch those people very carefully and make sure that the public interest is paramount.

Another problem with the current regulation of cable is that there is no clear understanding of what access is. I don't think there is a clear understanding what it means to have access.

Is it in fact a marketing tool? Oceanic cablevision seems to think so as they place it under marketing. Is it a marketing tool or is it a right of an individual to communicate. And if so, how? These problems have never been addressed adequately at the state or local level. Or in most other places for that matter.

I don't see any organization currently charged with the development in any real sense of access in a governmental, educational or public sense. The cable companies say that they are not in the business of promoting access as it's costing them money.

So, these are some of the problems I've seen. Perhaps we could get to the suggestions I have and to some which others here this morning have.

First of all I'd like to suggest that an organization be appointed by a governor's committee, the DRA, the governor or whoever for several purposes.

First we should develop storefront access centers throughout the city. Currently we have one access center that's operating in the evenings out of oceanic cablevision. It's in downtown Honolulu and to get on cable you have to go there to get on live. Otherwise you have to deliver them a video tape. The idea of a storefront system of access centers is certainly not technologically difficult. From the things we have talked about today it's very simple. Secondly this organization would work at encouraging and promoting the use of public, governmental and educational access channels by the communities. I live in Pearl City and we don't have much representation in the media. I would like to see the cable systems become a little more localized than the direction they're heading right now. Clubs and organizations should be helped to get their messages out via cable. They could have meetings on cable for those who could not attend.

This organization would develop new uses of cable here. In the area of medical t.v. I don't think we've explored it very much but there are a phenomenal possibilities there for diagnosis, for two-way communication with doctors, for storefront medical clinics, for public information, for in-out patient information, etc. I think there's some interest in the alternate media center among senior citizens. One of the major problems of senior citizens is transportation. If we could have a "trade-off" as has been suggested between transportation and communication we might eliminate the problem of senior citizens being less mobile than most of us.

We talked this morning about library and information systems making use of cable t.v. I talked earlier with Edith Webster and she recommended campaigns being waged over cable t.v.

This organization would have an additional function that is to develop further funding for cable use and cable experimentation through the formulation of applications and proposals for grants from Federal agencies and local foundations and organizations. There are a number of labor unions on the mainland exploring the use of cable as a method of education for their members. Being such a highly unionized state, I think Hawaii would be ripe for such activity. Another use of such an organization would be to develop the work and industrial uses of cable through industrial training programs for companies such as Hawaiian Electric and telephone company. Another possible use would be to develop the governmental uses of cable television for weather alerts, weather information, government information and information of all kinds.

I recommend that this organization we're proposing be an independent organization. Independent from the cable companies, independent from the DRA and other governmental influences as much as possible. The short term dollar interests of cable companies are not served by promoting access. They lose money by having to equip access centers. And they are in business to make money. And I don't see why we should say that it's their responsibility to provide us with access, to provide us with programming or to provide us with coordinators.

So far the work has been carried on by a few individuals who are very dedicated and action oriented. They need to have some organization to support their interests.

A problem that has developed for the cable companies is that the company itself is prohibited from placing any kind of prior control on content yet they are responsible in asserting that certain criteria are met in terms of obscenity, etc. It places them in a very uncomfortable position. In New York they had some obscenity problems and what they've done is to say that if it's questionable with anybody on the CATV staff, it will not be shown.

If the viewer or producer doesn't like it, they can go to court. So they're being much more restrictive. I see that as a real danger here. We've already seen some cases of prior censorship on the part of some of the access programs.

That's basically what I'm recommending. I think that would be a very realistic approach if people really wanted to do something about a communications network within these islands. Perhaps we can talk about it further some other time.

"PUBLIC INTEREST--PRIVACY, RIGHTS,

EQUITY, ACCESS, AND CITIZEN PARTICIPATION"

Edith Webster, Panelist

Ken referred to this as a conference of experts and incestuous relationships but I don't think I fit into that as I'm not an expert in the technologies of communication. So I hope I can bring into this an ordinary citizen's viewpoint.

I sat here and reacted to all the things I heard. And I feel a little bit like the way when I'm confronted by a large cockroach in my kitchen. It's there as somebody said the technology is in place, it's there, something has to be done about it, something is going to happen. I can't ignore it. There is a confrontation and I want to do something about it. But when I try I find myself frozen. I can't go after it, I can't catch it, I can't eliminate it and so I find myself unable to cope. Then I call in my husband and he deals with it.

I'm afraid the citizens are in such a situation. The technology is in place, it's here. The citizens certainly have an interest in doing something about this but are they going to be able to cope? Is the technology going to serve the citizen? Is it going to harm him? Will it be used for good or evil? Machines are a little bit like the Hindu concept of God, they're neither good nor evil. They have no desires, no aspirations, no ideals. It's the people who work them that have such motivations. So what happens in our technological communication revolution will depend upon the input of humans. The output will depend upon the input. I kept being struck by this when people talked about computers and all the other things.

The output certainly is controlled by the input, and control means power. Throughout history people who could control information have had power. Control of information means power. Now perhaps our technological revolution means that there will be a free flow of information and nobody will be able to control it. We could all find out whatever we want to about any subject we're interested in. Maybe it will mean less power in a few hands and more power in more hands. But the opposite could happen if we just are quiet and don't do anything about it. Maybe it will mean more power in fewer hands. A few people may learn the means to control this technological revolution and to control the data that goes out in a better and more efficient way than has ever been done before. We may then have more power in a few hands, more authoritarianism. Specters of things like surveillance of individuals immediately come to mind. So you see in my reactions to all these things I can see enormous chances for good and enormous possibilities for evil. It could go either way and in all probability it will go both ways. There will be things that

will benefit us and there will be things that will hurt us. We'll gain and we'll lose. And it seems to me it's very important that as many people as possible become a part of the formula so they can have some say about what does happen.

For instance, somebody mentioned the fact that with new systems you can filter out social and psychological biases and come to decisions on merit alone. But, what is merit? Do we want to filter out all social bias and all psychological bias? If you do that you're de-humanizing the process. Perhaps we need more of these biases and ways to bridge the gap so that we understand each others' biases but not filter them out. If we filter them out we'll end up with something completely dehumanized. Somebody mentioned Hawaii as a unique place. Maybe there will be no unique place. There will be nothing unique. It will all be one great big similar thing. And we certainly don't want that to happen. Somebody mentioned information deprivation and the possibilities for our technological revolution to overcome this information deprivation so that everybody could be served. Everybody could get information and education and the things they need. But it could happen the other way around. Somebody else mentioned that the next fad that was coming out was the video disk and it was going to start selling at about 400 dollars. Well you can increase gaps this way. After all we have a system of free enterprise and the machines that are developed as a result of our technological revolution will mean that things are produced for profit. And naturally, the people who produce it want as much profit as possible. So they're going to try and sell things for as much as possible not for as little as possible. And we may have things come up that are beyond the means of most people and so there will be an information elite composed of people who can get hold of data very easily and who can control it to some extent very easily. A great mass of the population will be left behind, left out of this revolution. Instead of closing gaps we may widen them. We may have more deprivation because if some people become smarter those who stand still are really becoming less smart, or less informed.

Nothing has been decided which way will it go or to what extent we will play a part.

Dave Jones mentioned that it was high time that peoples' needs be considered rather than the possibilities of technology. I certainly want to underline that because it seems that man will do whatever he can do. Technology runs on a pace, whatever it can produce will be produced. But the reason behind it is often hard to find. It's just because we can do it, we do do it. What are the peoples' needs? Will peoples' needs be served, or will we produce technology just for the purpose of producing more--to sell more?

What would be the effect on interpersonal relations? Will our lives become more impersonal as we deal more through telephones

and machines, computers, etc. Will we have the same opportunities for close personal relationships or will we become more dehumanized as we stay in our own little home and get everything there instead of going out and meeting people and forming close relationships? Will intimacy be lost?

Another thing is time. Somebody mentioned that time will be compressed allowing one to do so much more, faster. For instance, take the idea of instant polls and instant votes. You can say this will make our process more democratic because we could conduct polls almost immediately on any subject. We can get everybodys' vote, not just those of a few people. On the other hand if this is done too quickly there may not be time to obtain balanced information. This raises the possibility of bias as you can never find completely objective information. People need time to react, to feel fully, to discover what they want, to think, to apply wisdom. In other words, just reducing the time it takes to do something is not necessarily a good quality. It may be, it may not be, but here again there are possibilities for good, possibilities for evil.

Somebody was talking about models and how useful they were to predict the impact of various policies. Undoubtedly they will be very useful and have been very useful. That same person immediately said "we've built a model and we had a limited amount of data." There is no perfect model and there will never be complete data. The kind of data that's chosen to be built into the model will be decided upon by some people and they will have their biases. So even with models it won't be a perfect situation. The important thing is to get models as complete as possible and to get as many people into the process as possible. Here we need to have citizen participation. The people who are going to be affected should have something to do with the outcome.

It all comes down to the question: Are we engineering communication or are we engineering people? And people are changing, our technological revolutions change people, we're becoming different. Maybe we'll think less and act more, maybe we'll use less wisdom instead or more wisdom, maybe we'll deny our feelings and become dehumanized.

Certainly, there are a lot of exciting possibilities as well. I don't mean to give you the impression that I'm just a pessimist because I'm not. And I'm very much excited about some of the possibilities. For instance, in our work in Common Cause we have some very practical problems, such as keeping in touch with all our members. We have about 1,300 members, about 1/3 of which live on neighbor islands. We have a real difficulty in keeping in touch. Telephone is too expensive, mail is too expensive--we can send them newsletters perhaps 4 times a year but we can't keep mailing out things every day. Maybe there are possibilities here in computerized conference systems where we can actually have a state meeting where we can all be in touch and get input and exchange ideas. This is a very exciting idea.

In relation to computer conferences, time is important. When you interact with people there's a need for time to get mature reactions. I wonder about continuous conference systems where an organization like Common Cause might have a continuous conference arrangement whereby we can continually, from the central office, put in things that people at their leisure could consider. When they have considered it as fully as they cared to they could respond. This would seem to me much better than the instant conference in terms of mature judgement and improved personal reaction.

I would like to leave with one important idea and that is as technology is developed I hope that citizens will be consulted as much as possible. They should be brought into the process as much as possible. I think that a great deal that happens will be the result of government policies. I hope that citizens will be active in working toward solutions that will take us all into consideration.

One of the very exciting possibilities about the communication revolution is that we could have a free flow of information from government to the people. We have what we call a sunshine law now which provides for open meetings. But we haven't gotten minutes yet and we haven't gotten reports that are available. When we go to ask for them they say they aren't available or they say they can give you a copy at $1 per page. This means that a 100 page report costs 100 dollars effectively shutting us out from government policy and decision making in many ways. Maybe the new technology will allow for a cheap, inexpensive method for citizens to get a free flow of information from government. And then of course we would need some means of getting that flow back to government. I think that will happen if we can get a free flow out from government we can get a better flow back in.

QUESTIONS AND COMMENTS AFTER PANEL 4

Gerald Sumida's comment--About this time in most conferences we get into a nitty, gritty hard look at issues aspect of things. And about this time too, following on both David's and Edith's comments, we get the general types of aspirations, "Well somebody should look into this...hopefully the government will... somebody is," and so forth and so on.

Let us make a number of assumptions. First, let us assume we are concerned with Hawaii and our lives. Second, let's assume we are in a communication era. Third, let us assume that the technological advancements that are now taking place in the whole communication system and society will continue and we will not individually or collectively really have too much influence as to the timing, the scope or the nature of a lot of these innovations. They will happen someplace at some time and we will become aware of them either directly or indirectly. Let us then assume that the way our society operates is by certain types of informational channels which are linked to the exercise of political power. If we make all those assumptions, it seems to me the conclusion is obvious. We are talking about forming some kind of very effective, somehow accountable, communication lobby. David's idea is very interesting. However, as I think both Ken and John will agree having worked with both types of corporate forms for many years, corporations can get to be very unaccountable types of entities that run away from you. It doesn't matter whether they are small, whether they are huge, whether they are in private form or whether they are in public form.

I think what might be needed (unless you want to take a Ralph Nader type approach with his type of organization) is a new form of organization, perhaps vaguely foreshadowed by entities such as Common Cause or the League of Women Voters. Call it the communication lobby, call it whatever you want, but there has to be an organization which is not afraid of and understands the use of political power in its various forms. It has got to be an organization which through any means must be able to keep its members informed of the various things that are happening technologically, politically and culturally to the communication revolution. It has got to be an organization which is very broadly citizen-based. There are many elites and there are even elites of citizen organizations. And if you have followed for example the discussion within voluntary societal organizations, within the United States, everytime they have a general meeting to discuss where they are going one of their earliest topics is how can we democratize voluntary organizations. And these are the groups which everybody holds up as being the essence of democratic organizations. But this is not so. We seem perhaps to be run by elites and this seems to be true as well of voluntary organizations.

If we are talking about a communication and information type of society then perhaps it's the time to invent just such an organizational unit which will be able to insure that some of the more fearsome aspects of the communication revolution do not take place and that some of the more desirable aspects do take place. If this is not done then I suspect that at annual conferences like this we will keep on saying "Isn't it too bad that...," and, "shouldn't we have done such and such," and, "only if we had known or anticipated that..." and then we'll go on and somebody like me will probably make these closing remarks and everybody will say yes and then the cycle continues. But, if you look at how things get done, regardless of what the substance is, whether it be in the public sector or the private sector, you are talking of political processes. There's nothing bad about the political process, it can be fun, it can be tiring, it can be aggrevating and frustrating and all that. But that's what you're talking about. And I think here in Hawaii we just happen to have a bit more open and a bit more responsive political process that which can be found in many other places. Either we take the initiative and do what we can do or else, as I said, somebody like me will make comments like this at every conference we have.

Comment by McConnell--I have a general comment along the same lines. That is if you wait for government to solve your problems they won't get solved. If you wait for government to give you the information you need, you probably won't get it. Government really is a conflict-resolving mechanism; it responds to pressure. I think economic interests recognize that very well. Citizens' groups, consumer groups are less organized. They don't have the central thread, the common interests that some of the more vested interests do. Consequently they're weaker in that process. But I think you have to recognize it for what it is, and there's no place like utility regulation or communication to see how this process works and how vested interest have a great deal of power.

Comment by Barney--I am concerned about the overriding comments that we've had so far of elites, communication elites. Comments that private citizens cannot know enough possibly to participate in planning, that we have to be concerned about the flow of information from this elite to that elite. I think that if we continue to go in that direction it's a bad road to follow. I think the opening up of the communication media through cable television is one way we can counter that force. We can get political pressure, political action, as Jerry says, into the hands of the people who give the politicians their power. I'd like to see that happen.

Comment by Webster--I'd like to follow the possibilities of political campaigning through cable television. Common Cause is interested in seeing more fairness and equality in political campaigns, so that campaigns aren't based so much upon fund-raising ability. There should be more access to the public

for anyone who wishes to campaign. Cable television is one way that could cut down the costs. If people can campaign by cable it wouldn't cost them a great deal of money. Also, there's the possibility for public input into the campaign process. The supreme court decision has thrown us into the position where we can limit the amount spent on a campaign only if the campaigner accepts some public funds. If he accepts no public funds you're technically limiting his right to free speech. But then he can raise any amount he wants or use any amount of his own money he wants. So you don't get any equalization. So, we'd like to see both cheaper ways to campaign and a way to put some public funds in without it being burdensome and so that people can be limited in the amount they spend.

Perhaps there has not been enough said in this panel about privacy and rights of citizens. The possibility exists of surveillance of individuals in their most private affairs such as the amount of money they have, their health records and so on. I understand that insurance companies can find out from data banks a great deal of a person's health information and so on. This brings up the question of what is privacy and what information about ourselves should be included in a right to privacy. It also raises the specter of errors. In fact if an error gets into the computer and the person to whom it relates has no awareness of what's in the computer he has no way of knowing it, let alone being able to correct it. I think this is a vital area of concern that we must think about.

Comment by Barney--Just to follow up on that, Edith, if the government chooses to regulate and if the government chooses to mandate, then I feel that the government has an obligation to ensure the mechanism for development. I'm speaking in particular of cable television. Right now we have no interconnection among systems on this island as far as access goes, so it would be very difficult for us at this time to have an island-wide cable television campaign because there is no mandate on interconnection.

Comment from the audience--A company that does radio and television surveys came up with the idea that people who have unlisted phone numbers might have different radio listening habits than other people. They decided that they would get hold of the unlisted phone numbers across the country and make a survey. And this has happened. And this is an infringement of privacy. It is an invasion because an unlisted phone number is not public property. But it has become so. So, the can of worms has been opened and let us be very careful.

Comment from the audience--I'd like to speak to something Edith and Barney mentioned. That is campaigning by cable. I was in charge of Oceanic Cablevision's cable coffee hours, campaign via cable during this past election season. (I am no longer with Oceanic Cablevision.) This was very little used. The cost was a token, a mere $5 for a half hour which we felt

was eminently reasonable. This fee was charged also to eliminate the possibility of being accused of giving time for something of value to any one candidate. But hardly anyone actually used this service and to the best of our knowledge no one ever made it clear to us that the use of the cable was significant to their campaigns. I suspect the penetration was not great enough to compete for time with a half an hour of comparable time on a commercial station--even though the costs were astronomical to do so. I don't feel that at 7 p.m. a person is likely to tune out KGMB and into Channel 21 of their convert a box in order to see a political candidate. No method of publicity could approach the publicity of the commercial VHF stations. In connection with what you two people were talking about, I was reminded of a quote attributed to Henry David Thoreau, the naturalist. When Thoreau was informed that a telegraph line was to be constructed which would link Maine and Texas, he is alleged to have said, "that's very good but suppose the people in Maine and Texas have nothing to say to one another." I think this is the problem with access. It's all well and good; the system is there; anybody can walk in off the streets and sign up with oceanic cablevisions access, but the fact is nobody uses it. I think it has less to do with inaccessibility or unfamiliarity than with the fact that people are not in fact accustomed to communicating by any means other than the standard methods.

Comment by Barney--I think you could have said the same thing about the telephone 50 years ago. The fact that the use of access is only by a few people is not important.

Comment--Telephone is a point-to-point switched system and there's a big difference between that and cable-casting as presently constituted. I'm also involved in citizen-band radio and find a great cross-correlation. Citizen Band radio is the "ultimate" right now. Even the broadband of cable, color t.v. seems more attractive.

Barney interjects--It's certainly more accessable to have a CB unit in your car or home than it is to have an access point downtown on Cook Street. And also I'd like to follow up on few of your other points. The fact that few people are making use of access in this city can't be laid on people who are using it and you can't lay it on the DRA. I feel you can lay it directly at the corporate beings who are in charge of the cable systems. In Redding, Pennsylvania there's a tremendous use of access and has been since the Ku Klux Klan had their first meeting. All of a sudden everyone was aware of access. To follow your political point, I think you had more of a corporate interest in getting those people on. I think it was more of that than, say, getting the League of Women Voters or Common Cause to sponsor the program in which case you would have had a built in network that you could have taped for your viewers. I think this would have been an important consideration in your viewing. I don't consider past failures a reason for future failures.

Audience comment, Ted Merrill--I would like to suggest, first of all, that "Citizens for Community Cable" is a misnomer. I think it should be citizens for community t.v. I don't think your audience cares much whether they get their picture and their video off the cable or off the air. I think one of the problems, and I've heard it mentioned here, is that the FCC in effect has set up cable versus broadcasting as two different things. I'd also like to say, as John McConnell knows, we've recently completed 2 years of hearings in the telephone rate case. One of the big factors of this was the matter of separations. The FCC says this, the FCC says that, and we think they mean that and so on. And when you come down to the footnote on the bottom you see that what the FCC said on that issue doesn't apply to the State of Hawaii or Alaska. Now being an island state way out in the middle of the ocean there are possibilities that we can do things that are not considered on the mainland. I think if you have a citizens committee concerned about television they should not be locking themselves into transmission by cable alone. The possibility of establishing a telecommunications office has been discussed in the past. We've talked about technical possibilities in communication here, and one of the reasons we don't have a lot of the things that are available today is consistent with the regulatory system that we have. And maybe some of you may not know that we here in Hawaii are unique in that we have only one telephone company. And that telephone company is owned entirely out-of-state. We are being served entirely by absentee owners. The company that owns Hawaiian Telephone is only something like 8% of the total telecommunication market in the nation. In completing this theory, we have an adversary position between the Public Utilities Division, the primary regulatory agency, versus the entire might of the telephone industry. How can the staff of the PUD effectively operate as the consumer protector? Under legislation past last year the PUD was supposed to have 17 or 18 additional bodies to do that and they didn't even get that. In response to Mr. Sumida organization does exist in the Statewide Telephone Users Committee which has been active for 2 years. And I'd like to see what John might have to say as to how he feels where the Department of Regulatory Agencies is on the matter of the telecommunication office and what other suggestions he might have. In conclusion let me say that my impression of this rate hearing is that the decision which comes out will be strictly based on legal grounds, which I think may be very far removed from what Edith has mentioned as the "public" media. I think it's about time where citizens wanting to see some advancement in communications start saying let's change the laws. Let's get the humanities into the picture and not continue on the basis of regulatory methods which were established way back in the days that Dallas Williams was talking about when the railroads first came out. So, I contend that our regulatory system is certainly a horse and buggy manifestation and how do we go about to changing it?

Barney comments--First of all, I'd like to support what you say about the out-of-state ownership of the phone company by saying that all of the commercial television stations are now owned by out-of-state firms. Next, we are concerned, as Citizens for Community Cable, with the communication aspect that is afforded by the many channels cable offers--a minimum of 20 required by law--and the uses that can be made of those.

John McConnell comments--Ted asked me a question. I go back to what I said that yes this technology is there. As for its use, I think you have to maximize the opportunities for innovation, for people in the private sector to try to use it in economical ways or whatever ways they want. I think if you could get that type of climate, rather than a strict monopalistic regulating climate, we'll have more and better users. Again, I recognize that there are economy of scales involved and a certain amount of regulation is going to be required.

In answer to your question about whether we should have an office of telecommunication policy I think that too often we want to create more bureaucracy when we've got a problem. Sure it would be nice to have an office of telecommunication policy. But again, you've got to set priorities and you've got to decide where you want to spend your money. And that is done over at the legislature.

John White comments--I'm suffering from involuntary information deprivation. There's been a lot of talk about cable t.v. At the governor's task force I listened to part of their discussion. I got very enthusiastic. I went home and looked in my yellow pages and called one company up. They asked me where I lived and I said Makakilo. They said they had the island divided up and they have one part and other companies have others. I said who has my section of the island. So they gave me the name of the company that has my section. This company told me they have no cable hooked up for Makakilo and no plans of ever putting it in. Now they own the communication rights to my neighborhood and they refuse to serve me. Is it going to last indefinitely?

Comment--That's a good question, John. When the legislature established the law they divided up the world of cable t.v. They established as a policy that these systems should expand as rapidly as possible and cover the whole state. But there are real problems in enforcing that. I think you have a good point but let me just give you the company argument because it's there. They say we've developed the areas where the off the air reception is bad and where we can achieve a high load factor. That is we can get a lot of people to subscribe. They say if we go into these other areas we're only going to get about 20 or 30% since they have good off the air reception. They say we can't afford it. We have to have our capital cost up front to expand the system. With a 20% subscriber ratio we can't make a go at it. I'm hearing some

cases right now where we're taking a hard look at what some of them are doing and I don't want to comment on it now. But it is a legitimate issue, the money has to come from somewhere first for the upfront capital to expand the system.

Comment by Sumida--One thing you might consider, which maybe smacks a little bit of lawyer talk, is that if you have in effect a public decision to allow what is otherwise in violation of anti-trust rights, to a certain private entity to do something which is a private mandate and they're not doing it, consider then to sue them, force them to do it.

"CLOSING REMARKS"

Richard Barber

The interest in this meeting, manifested by such a good turnout, strengthens my belief that communication issues are beginning to reach a broad audience in Hawaii. We have heard in panel discussions references to a number of specific interests and activities. Indeed, the topic is extremely broad and we have not touched on several important topics.

I would like to spend a few minutes outlining current government and university activities in communication policy and planning. (This will be an incomplete account). I will then outline some possible follow-up steps to this meeting.

There has been an increase in the tempo of government interest in communication. The Governor's Task Force on Telecommunication User's Requirements is still "alive". A survey of State Government usage has been completed and is now being analyzed.

In the last session a House Resolution called for the establishment of a State Office of Telecommunication Policy. Discussions about this have been held with members of the telecommunication industry.

The State General Plan outline calls for a discussion of land use/transportation/communication--an indication of official administration recognition that communication is an important community resource. More recently, conversations have been held with State Department of Planning and Economic Development staff in which some of us at the University were asked to provide suggestions as to how communication planning might be approached. One of the purposes of this conference is to attempt to define some of the issues in part as a response to DPED's interest.

The State has also appointed a CATV citizen advisory board. But, as is too often the case, the board hasn't been activated.

The State has taken an interest in the now postponed Pacific Telecommunication Forum. This would be an OTP organized meeting designed to bring persons together from the Pacific Region to discuss in an informal setting, telecommunication problems and possibilities for the future.

Some of the current academic interest in communication includes the PEACESAT project which involves a number of low-cost voice stations in the Pacific connected via ATS-1. The ALOHA System has been concerned with computer to computer communication via satellite, with packet switching and the use

of radio signals for data transmission. A number of proposals seeking to address telecommunication/transportation tradeoff questions, CATV usage, ATS-6 use, etc., have been prepared. Although we have yet to receive any large grant awards, the experience has brought together a number of scholars from several different fields.

International conferences have been hosted by the East-West Communication Institute addressing topics of information flow, PEACESAT use, policy and planning for development and population information systems. A major program in policy and planning for communication is now under way at the Center.

The Communication Research Group of the Social Sciences and Linguistics Institute and the Hawaii Research Center for Futures Study (with support from DPEO) is compiling a directory of people, projects and organizations concerned with or working in the field of communication. We now have a computer-based list of more than 300 individuals.

There are a number of other activities which could be mentioned. Specific note should be made of the several citizens groups now concerned with communication matters. Included are the Honolulu Community-Media Council and the Oahu Council of Presidents' task force on communications.

Plans for the immediate future include the organization of a series of in-depth seminars on several of the topics covered today. We see the need for perhaps half-day meetings preceded in some cases by the circulation of working papers or the exposure via site visits to particular industries (e.g., Hawaiian Telephone Co. plant; Hawaii newspaper agency; COMSAT station, etc.). Four or five seminars may be held this spring and early summer followed by a "Summary Conference".

Based upon this exposure and learning experience, we hope to be able to commission a series of studies to add detail and documentation to our work.

Further steps and work will hinge upon the feedback from this conference and the proposed seminars.

"CONFERENCE SUMMARY"

Phillip J. Bossert

In his opening remarks, Gerald Sumida set the tone of the entire conference when he noted that, while Hawaii must increase its communications facilities and information processing capabilities in order to become the "Terran Center" of the Pacific Basin, policy and planning must also take into account the values and assumptions that underlie the development and control of such facilities and capabilities. Information does not give us meaning and value, but rather provides an environment in which meanings are formed and values are determined. Technics (technique, technology) is supposedly the type of knowledge that provides the means and methods for accomplishing goals and living our lives, but Marshall McLuhan has indicated, the medium, tends to become the message itself; the means become the ends. As the rapidly increasing speed of communications technology transforms the distances of space and the durations of time in which human beings relate to one another, time and space are no longer the means to live, but the foundations of human existence.

Thus, Gerry Sumida's caution to us, that the message of "Aloha", can either be destroyed or promoted by the manner in which our communications and information technologies are developed in Hawaii, is well worth listening to. Perhaps we need to take another look at the Aloha Spirit and try to understand it as a technique or as an attitude to employ in the formation of Hawaii's communication policy.

The first panel discussion on "Changing Communications Technologies" brought out several important points about the problems and possibilities of change. Ned Weldon pointed out the propensity for error in predicting the future, not only because we can't imagine the new technologies of the future but also because we cannot really predict what will happen with the technologies that already exist (case in point: the explosion in the number of hand-held electronic calculators of the last few years). A recent report noted that last year alone, over 10 million CB radios were sold in the United States. Ironically, while most of communications planning seems aimed at decreasing the dependence upon transportation and at making the home or office a communications center to bring information in and out of, the increasing number of CB radios installed in motor vehicles may make the home obsolete rather than the automobile!

Two important points that emerged from the discussion dealt with the problems associated with the exponential growth of information available and in the rapid change-over in hardware systems themselves. The speed of modern information processing systems coupled with the ease of access to this information via sophisticated communications networks will eventually (if it has

not already done so) overwhelm the individual with information ostensibly designed to help him make decisions. There is an old saying, "Information is power", and coupled to another old adage, "Power corrupts", we can understand the sense of Charles DeGaulle's modern adage, "Power is impotence". Too much information can be debilitating. If we arrive at the point where we can't begin to consult all of the necessary information that we are aware of before making a decision, we are left with an undesirable dilemma: Either we never get around to making the decision because we are always doing the research for it or we make the decision in the anxiety of knowing we don't really know all of the relevant facts. Perhaps the skills needed, not so much to solve this dilemma as to survive it, are those of critical analysis and value consciousness. If information overload is the problem to contend with, the proper weapon appears to be "selectivity". The machines have taken over the task of providing the breadth of information for us; we are left with the role of finding the proper criteria (values, assumptions) and analytical methods to help us select from our increasingly complex information environment. Accompanying this may be the necessity of shifting from a logical concept of "truth" (i.e., the correct answer, approach or way of doing/seeing things) to the more aesthetic concept of "truth" as revelation or discovery (the Greek, alethea) so that, using different criteria and different methods to process the same information will not leave us with the anxiety of having to choose which of the resulting answers is correct but rather with the satisfaction of having created numerous possibilities for acting.

The second of the two points that seemed especially important to me in this session was brought out in a discussion by John White and was concerned with the problems created for marketing by the rapid changes in technology. He noted that technologies in communications and data processing are changing so fast that people are more and more reluctant to commit themselves to a specific system for fear that it will be obsolete by the time they get it. The culprit now is not only the amount of stuff available to choose from but the amount of time we have to choose and use it. The research and development money that makes these rapid changes possible comes from the same companies that sell the research results to make money in the first place. If nothing is marketed because of the "wait and see" attitude mentioned above, then the sources of research funds will dry up and the innovation in these areas will slow down or cease altogether. Leasing equipment rather than buying it solved this problem at an earlier date, but now we are at the point where equipment is obsolete even before it is manufactured, much less marketed. This too is a problem of selectivity, both on the side of the seller and that of the buyer, and will require the sort of policy making and planning that allows both buyers and sellers the sort of foundation they need to confidently drop anchor in this swiftly moving stream of technology long enough to get some fishing done and yet not so long that they become attached to a single place and lose both the interest and the knack of flowing with the stream of change. This situation

is not something new; it is a form of the future shock Alvin Toffler warned us of a decade ago. The power of the human mind is now so overloading the accepted physical constraints of our "modern" world, that it is perhaps once again time for another Renaissance with an accompanying redefinition of the "time" and "space" of the "world" we live in. The Copernican revolution redefined the time and space of the medieval world because these concepts had become too confining for the reaches of the human mind.

The second panel discussion on "Information Flow" also struck several particularly relevant chords for me. Jan Huston's discussion of the benefits of computer conferencing networks brought back memories of my own experience in the military with the international communications networks of the US intelligence community. The benefits of computer conferencing are indeed great--speed, convenience, cost-saving--when the need is for communication along purely rational lines. When the need is for exchanging data, testing ideas and group reasoning, computer conferencing will serve us well--I think perhaps of doing away with professional journals in areas of research that are moving so quickly that research is obsolete by the time it can be published and distributed, and replacing them with an on-line, daily updated computer conference network where all researchers start their day with a printout and end their day with a report input. However, when the need moves beyond this very narrow area of human endeavor I am more sceptical. Getting rid of psychological and social biases in scientific research on lasers is fine, but such "biases" become relevant data when the subject of discussion is society or politics or the individual. Computer conferencing loses several important dimensions of language (body language, eye contact, etc.) to gain its speed and convenience for rationally pure undertakings. While the way a person looks is perhaps irrelevant to the rarified air of scientific research, the way people look and smell and talk is very important information in most other discussions. Again my own experiences with communication technology 15 years ago definitely biases my view of this powerful technological tool. The same technology that made international communication possible also made it possible to tap and tape unnoticed the telephone conversations of an entire city, and the fact that I was so fascinated by this marvelous creation of Ampex Corporation for so long and now realize that I was indeed addicted by it to the point of failing to use sound ethical judgments in its use had made me overly cautious. I went into the military service a physics major but I exited a philosophy major.

The danger, I think, lies in confusing the proliferation of surface images with depth understanding. Technology and art are not different--they are both creative enterprises that demand more than just information; and I wonder if knowing what other people think about something does not often hinder our creative responses to an issue of a problem. We must again be careful that the increase in communication and information provided by a sophisticated computer conferencing network does not debilitate our effort.

The quote from Alexander Bell that ended this session is appropriate in this respect. If we are going to really forge ahead in our planning and discovery, then we must go off into the bush and stay away from the beaten paths. One of the panelists claimed that Hawaii needed to catch up in its communications technology with the Mainland. This strikes me as being, at least in part, a losing effort to follow the lead of the Mainland rather than going off on our own. We need to keep up with what is happening for sure but to actually catch up might not be as advantageous as charting new paths in these areas that are much more suitable to Hawaii's geographic and socio-cultural situation. Perhaps this is unrealistic and uninformed dreaming, but I believe that many of our communications problems might be solved more easily if Hawaii became a "source" of technology rather than a recipient of it.

The third session on "Skills Needs and Developments" centered mostly on educational issues. Chardin, the French paleontologist, declared over 20 years ago that the "age of nations is past--it is time to build the earth"; but it has been international television and, a single important event, the view of the earth from the moon and outer space--both achievements of technology rather than of philosophy of political science--that have made Chardin's words seem like something possible in our own lifetime rather than like a utopia. Thus we gain a broader perspective on the world and on ourselves as a result of increased inter-cultural, international and even extra-terrestial communication.

The problem involved in working Chardin's goal can be seen as twofold: making people aware of the services and technologies available and helping them to acquire the skills necessary to use them. Media literacy in general and keyboard skills in particular were pointed out as prerequisites for accomplishing this. Just as rapid changes in technology make hardware obsolete at an ever increasing rate, so too does the resulting change in society and everyday life make many of our human skills increasingly obsolete. Learning a skill for a lifetime of employment is really no longer a viable option in a country like the United States. We must rather see our life as a continuous process of gaining skills and using them. Neither formal nor vocational education can be seen any longer as just a stage along life's way; learning is much more an integral part of our daily routine. If we fail to recognize this, we tend to work to keep the world the way we learned it in school. We tend to block change, rather than to work to make the world the way we imagine it should be.

The fourth and final session on "Public Interest and Citizen Participation" raised numerous questions about the ownership and regulation of the media and technology, public apathy, and government resistance to citizen participation in the control process. The fear that citizens will continue to be excluded from decision making seems to be derived not only from the growing complexity of technology itself but also from the impenetrable bureaucracy

that supports and is supported by it. Several panelists mentioned the possible creation of a new power elite of communications savants, a technological aristocracy. In addition to providing everyone with the training and skills needed to utilize the abundant technology, several speakers called for greater public access to the media, cable television in particular, as a form of protection against the development of an elite communications class. The panelists concluded there is also a need to include public participation in the decision-making process of the regulating and governing agencies. The implication is that "we" the public need to protect ourselves from "them" the agencies of government.

I have two criticisms of the panelists' conclusions--the first one I call the Jeckle-Hyde syndrome and the other is the general apathy of most people toward a situation until it directly costs them something of importance. The demand for citizen input into the governing processes assumes that the people who now govern are not themselves citizens and it also assumes that the watchdogs of the processes would somehow be more free from corruption and error than the agencies being watched. We almost always assume that when we leave our home in the morning as Mr or Mrs citizen and enter our workplace we do not drastically change into some sort of being that needs a citizen's committee to watch over us. Yet we often assume that others switch from Mr. Jeckle Citizen to Mr. Worker Hyde and that the later is in need of citizen observation. We must ask ourselves, I think, if we really believe that what we ourselves do (teaching, driving, selling, etc.) is in need of the same sort of controls that we wish to place on others. As a member of Common Cause I am, or at least was, of the opinion that government needed policing and that I wanted to be a part of the police force. Yet at the same time I was fighting against increased attempts to give government regulatory and information rights in education--they should not be policing me at my job but the reverse is OK. The whole WE-THEY opposition and the attempt to control each other becomes absurd as soon as anyone learns enough about another area of work to realize how complex it is to observe much less control it. I cannot possibly spend enough time learning about legislation to be a critical observer and watchdog and still do my own job in a fashion that is responsible and productive. The same is true of other areas, and yet we are daily admonished to join the citizen's commission on this or join the public watchdog on that. I believe it is naive to think it can be done; we would simply all end up watching each other and nothing would get done. And in fact most watchdog groups end up raising money, hiring a professional staff and then letting the staff decide what the watchdog group should vote on or be outraged against. I know that I often write my congressmen notes suggesting or protesting things that I have never heard of; I do it because the people at Common Cause told me to and I trust them. What don't I trust the people I elected to office in the first place?

Rather than reinforcing the WE-THEY feeling by setting up guardian groups, let us dissolve it by insuring that everyone is part of the WE. That task is not so much one of activist opposition

as it is active promotion of the skills necessary to open up the whole range of communications and information processing technology to as wide a group as possible. This is citizen participation and public interest in the positive sense of joining in the benefits of modern technology.

The conference as a whole spent much more time on epistemic questions than it did on technical ones. This suites my own interests in the subject very well and I was very happy with the whole affair. That planning and policy making efforts are focussing on such issues more than on the matters of engineering the technologies themselves show, I believe, a significant change in the direction of planning. We have shown ourselves to be good at developing and planning the what of communications technology, the systems; and now turn to plans of how to implement this technology. I share the interest expressed by many at the conference that this sort of communications conference should be a regular thing.

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APPENDIX B

PARTICIPANT PROFILE

As a part of the conference registration procedure, we asked people to respond to a few questions about what they did and about their interests in communication. The following is a brief summary of the information gathered.

Number of Participants by occupation/place of work

Private Industry (service)	23
Private Industry (manufacturing)	1
Government	14
Education	34
Non-Profit Organizations	4
Retired	2
Student	17
Other, no response	5
Total	100

Most important issue topics checked by participants

Issue topic	Number of checks
Privacy, access to information	33
Education for the communications era	30
Communication technology	29
Computer applications	26
Communication rights	23
Information availability to the public	22
Cable television	16
Communication regulation reform	15
Telecommunication/transportation tradeoffs	14
Public service satellite use	10
Effects of television on society	10
Telephone service and rates	9
Spectrum allocation	5
Private satellite use	5

A G E N D A

APPENDIX C

HAWAII'S COMMUNICATION FUTURES: POLICY AND PLANNING ISSUES

Monday, January 17, 1977
Hawaiian Electric Company Auditorium
900 Richards Street, Honolulu, Hawaii

9:00 Opening Remarks
"Alternative Futures" - Gerald Sumida, Commission on the Year 2000
"Conference Orientation" - L.S. Harms, University of Hawaii, Communication

9:30 "Changing Communication Technologies--Options, Problems, Possibilities for the Future"
Chairman: Ned Weldon, University of Hawaii, Engineering & Applied
Panel: -Karen AhMai, Hawaii Research Center for Futures Study
-Bud Schoen, Hawaiian Telephone Company, Planning Division
-John White, HONOFED & Hawaii Telecommunications Association
-Herbert Dordick, Annenberg School of Communication, University of Southern California

11:00 "Information Flow--Into, Across, Out from Hawaii"
Chairman: Jim Richstad, East-West Communication Institute
Panel: -Jan Huston, Survey Marketing Services, Inc.
-Miles Jackson, University of Hawaii, Graduate School of Library Studies
-David Jones, Hawaii Technological Information Center
-Dallas Williams, C. Brewer and Company, Inc.

12:30 Video-tape: Requiem for Literacy

1:00 "Skills Needs and Development--Multicultural, Multimedia, and Anticipatory"
Chairman: Syed Rahim, East-West Communication Institute
Panel: -Gil Aldrich, Hawaiian Telephone Company, Training Division
-Carina Christian, Chaminade College
-Gerald Dykstra, University of Hawaii, Communication
-John Southworth, University of Hawaii, General Science

2:00 "Public Interest--Privacy, Rights, Equity, Access, and Citizen Participation"
Chairman: Kenneth Kupchak, Communication Task Force, Oahu Council of Presidents
Panel: -John McConnell, Department of Regulatory Agencies
-Gerald Sumida, Honolulu Media Council
-David Barney, Citizens for Community Cable
-Edith Webster, Common Cause, Hawaii

3:00 "Communication Projects and People in Hawaii" - Richard Barber, University of Hawaii, Futures Center

3:15 "Conference Summary" - Philip Bossert, Hawaii Committee for the Humanities